

COMPUTERWORLD

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Would Compete With Bell System

Independent Communications Network Planned

System/3 Gets Its 1st Rival

By A.B. Williams
CW Staff Writer

GRAND RAPIDS, Mich. — A small system that could make life troublesome for IBM's new System/3 has been announced. Cascade Data Systems' new 88/30 offers reader speeds similar to the faster reader on IBM's "little wonder," and adds four cartridge tapes. The system is priced to sell for "under \$30,000" or to rent for about \$675 per month, substantially less than the approximate figure of \$1,000 per month that IBM charges for System/3 with comparable reader speed.

The 88/30 isn't called a mini. It isn't being marketed as a mini with major software and peripherals to be added at OEM or user level. The system has a good complement of software, which is tape-resident. It includes a 2K supervisor, an assembler with macros, and a representative package of utilities (data transcription, memory dump, and library maintenance). The company says that its tape sort will handle, internally, 1,800 records of 100-character length. This translates to one full cartridge.

Cascade is in the last stages of writing 10 applications packages scheduled for completion during the first weeks in October. These are inventory control, sales analysis, order entry, billing, receivables, payroll, labor distribution, job costing, payables, and general accounting. Two of the packages come free with the system, with each of the rest available for "a nominal fee." The company also offers contract programming at \$11.50 per hour, which is a little more than half the rate charged by IBM for similar services for its System/3.

Hardware-wise, Cascade is selling a machine which will cycle an 8-bit character in 900 nsec. Internal code is ASCII, which should make communications (as yet unoffered) a natural. The 60-character instruction set is "similar to 360, but not fully compatible," the company said. Standard configuration includes 8K memory, 16 registers (for arithmetic, bit manipulation, and address modification), two

(Continued Page 4)



Computer Joins the Team

At Kent State University, where a computer is being used to analyze game strategy, Coach Terry Mallett discusses plays with team members. Story on page 24.

Full-Text Retrieval System Recognizes Semantic Differences During Searches

By Peter L. Briggs
CW Software Editor

FORT LEE, N.J. — For the user who has everything, International Systems Design, Inc. now offers the "Compleat Data Base Package." It includes everything but the data, and can be run on any generally available super-computer (actually starting around the 360/40 with 256K) and offers complete indexing, retrieval software, and data management.

The package, known as the ISD Process and currently under patent application, can be obtained for a license fee of about \$20,000, with annual payments of around \$5,000. The real cost of this, as is true of all database-oriented systems, is the cost of data conversion. The company claims that it has developed and seeks to patent. The data base used consisted of about two million characters, and was resident on tape. The cost for this retrieval, based on \$6.50 per minute for the computer and eight retrieval

paper or in the form of literature.

Because of the problems inherent in producing a computerized data base from original text documents, other data base users have found similar, and frequently greater, conversion costs to be normal.

Successful Demonstration

The full-text retrieval process was demonstrated for CW, using a limited sample of the company's existing data base. The system was run on the 360/50 under Hasp, and completed a structured eight-level retrieval in about one minute. The small time required is, the company claims, due to the specialized indexing and retrieval techniques that it has developed and seeks to patent.

The data base used consisted of about two million characters, and was resident on tape. The cost for this retrieval, based on \$6.50 per minute for the computer and eight retrieval

requests, runs under 90 cents per request.

The system can handle either disk or tape-resident data, and can establish any type of indexing needed for any specific application. The installation process consists of defining the needed indexing, which can extend to full-text scanning if necessary and the file formatting necessary to optimize the data retrieval function. Multiple-level indexes may be established, allowing the user to retrieve information from several logical "directions" without apparent difficulty.

The company, a subsidiary of Compendium Publishing Corp., is based at 2175 Lemoine Ave.

CW contacted some of the company's potential clients who have looked into the system.

Some of them are thinking in terms of multi-billion character data bases, and feel that the package offers the only currently available solution to their

(Continued Page 4)

By Ronald A. Frank

CW Communications Editor

WASHINGTON, D.C. — A national microwave communications network in direct competition with the Bell System is being planned by Microwave Communications Inc.

Such a network would mark the first time that common-carrier communications facilities were available from non-telephone sources on a nationwide basis.

MCI, which last month received a precedent-making authorization to provide common carrier-type microwave communications between Chicago and St. Louis, has formed a service organization, Microwave Communications of America, Inc., to establish technical standards pertaining to operating and interconnecting the proposed network.

In commenting on the move, John D. Goeken, MCI president, said that an application for the second link in the planned system, a New York-Chicago authorization, had already been filed with the FCC (see story page 12).

In describing the MCI services that will be available to computer users, Goeken said that the microwave costs and bandwidth allocations will be tailored specifically to the user's requirements.

Data channel rates will be based on transmission speed and distance. As an example, Goeken listed sample charges for the Chicago-St. Louis link as follows:

Bit/Sec	Cost/Mile/Mo
75	.05
200	.06
2,400	.35
4,200	.57
7,200	1.00
19,200	2.50

One-Way Rates

He emphasized that the rates (Continued Page 4)

On the Inside

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Compat 88-23 batch terminal is designed to operate either in on-line conversational or unattended batch mode and stores data on loops of tape holding up to 50,000 characters.

Batch Terminal Stores Formats, Data on Loop

WESTBURY, N.Y. — A new batch terminal is described by its manufacturer as having complete send/receive capability in either on-line conversational or unattended batch mode.

The Compat 88-23 is a hard-copy keyboard-to-tape device. The tape is in loop form. Each loop has a 50,000-character capacity, which, the company says, should be enough for full field definition and data for a full day's work.

Compat Corp. has designed the unit to operate with Bell or other standard modems that transmit at either 1,200 or 2,000 bit/sec.

The terminal can be activated to input to the computer either from its own keyboard or, unattended, by the remote computer. Likewise, it can accept output conversationally or on tape for later transcription by the keyboard printer.

Error control is performed both locally prior to transmission and by the computer.

The distinguishing features of

the 88-23 are the tape loop, which can be prewritten with formatting information, and a small computer, designed to facilitate formatting, editing, error control, and general system control.

Compat, located at 177 Cantiague Rock Road, has designed an instruction set (25 in number) to handle the control and data manipulation functions. It does not appear to be aimed at making the terminal an independent processor of batched jobs.

The 88-23 is one of a series of terminals. Below it, in capability (and price), are the 88-13, which is essentially the same, minus computer, and the 88-03, which is designed for conversational use only and lacks both computer and tape loop storage.

The 88-23 is priced between \$9,600 and \$12,000, depending on options and quantities purchased. Its rental ranges between \$220 and \$370 per month. Compat expects to start customer deliveries by the end of Nov.

An Invitation

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Designed to Ease CPU Load

On-Line Sorter Works Under OS

ANAHEIM, Calif. — A new on-line sorter is billed as having the capability of saving substantial core and time, now consumed in internal sorting, for other multiprogrammed uses.

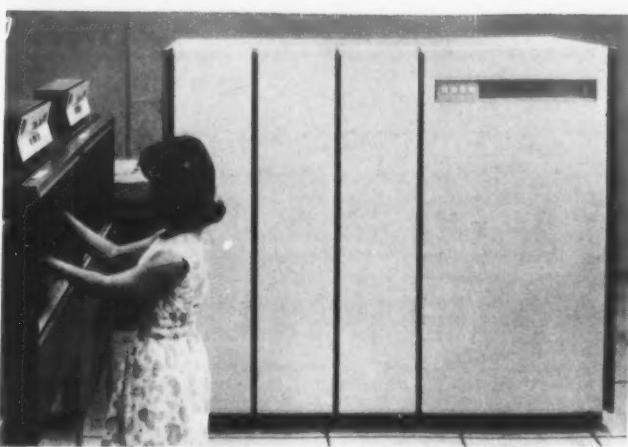
It plugs into the OS/360 sort through the B-15 exit and represents a new sorting algorithm, the company says.

It can be loaded from, and can output to, and standard 360 peripheral. It has a 2,500,000-byte drum, which is filled at 356,000 byte/sec over a selector channel in about eight seconds. A file that is larger than the drum will be sorted in pieces and merged back on the 360. In this kind of operation it will probably be true that two selectors are tied up, with the sorted file being unloaded at the same time as the new data is being loaded.

The core saving appears to be mostly in cutting down on the size of the partition required for the sort on the processor.

The company, located at 240 E. Palais Road, says that the sorter can handle records of up to 5,437 bytes in length, but does not support variable-length records.

The 1651 is priced to sell for \$300,000 or to rent for \$6,500 per month, including maintenance. The company estimates that a work load consisting of 20-25% sorting would easily justify the cost of the unit.



Astrodata electronic data sorter (right) is designed to relieve load on central processor.

USA Standards Institute to Adopt New Name, Move to New Home

NEW YORK — The USA Standards Institute, the organization responsible for establishing voluntary standards in data processing and other fields, is changing its name to the American National Standards Institute.

The change follows objections from the Federal Trade Commission that the current name implies a connection with the U.S. government. USASI is a privately financed federation of national trade organizations, professional societies, and consumer and labor groups.

No date has yet been announced for the change.

When the change is made, the standards it approves, now labeled "USA Standard," will be called "American National Standard."

The organization is considering a certification program under which its mark could be used in connection with products that have been found by independent test to meet the requirements of its standards. For example, a Cobol compiler which complies with the requirements of USA Standard Cobol could carry the USASI seal of approval.

On Oct. 6, USASI is moving to new headquarters at 1430 Broadway from its present location at 10 E. 40th St.

Varian Cuts Prices 18% on Minis

IRVINE, Calif. — Varian Data Machines has cut the price of its mini-computers 18%, the company announced last week.

The price of a 620/i equipped with 4,096 16-bit words of storage has been reduced from \$12,100 to \$9,950.

The 622/i, an 18-bit computer,

has been reduced from \$14,100 to \$11,995 (with 4,096 18-bit words of storage).

Varian's service facilities and personnel will be doubled during 1970 to provide engineering support for new customer installations, a spokesman said.

'Autoflow' Price to Rise 10% Jan. 1

PRINCETON, N.J. — The lease price of Autoflow, an automatic flowcharting system, will rise 10% on Jan. 1, the developer, Applied Data Research, announced last week.

The increase, the first since the computer documentation system was introduced commercially in

1966, will apply to all new leases after Jan. 1.

The new pricing schedule reflects substantial additions made to Autoflow over the past three years, according to Richard C. Jones, Applied Data Research president.

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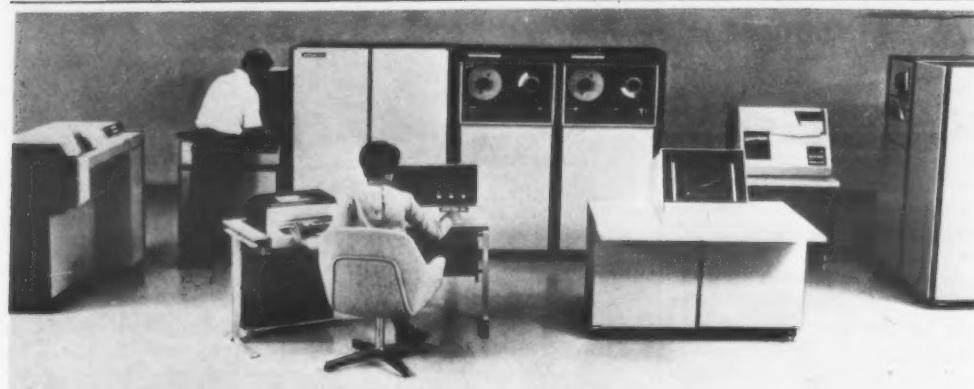
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Systems 86, smaller of the two new SEL systems.

Communication Network Planned

(Continued from Page 1) were for one-way service but added that this structure gives the user more flexibility since a high-speed service may be required to a computer, with data transmitted back to a user's site at a slower speed. With such facilities, the customer would pay separately for each service, rather than a fixed rate based on the higher speed, as would be charged by the Bell System, he said.

MCA carriers will offer subscribers a multitude of channels and a choice of terminal equipment that existing carriers cannot provide with telephone facilities. A total of 72 basic microwave channels will be available in bandwidths ranging from 200 Hz. to 1 mHz.

These channels can be purchased for part-time use, and up to five subscribers will be allowed to share a single channel. The channels will be designed specifically for data transmission to have an error rate not to exceed 1 error in 10-million bits transmitted.

Bell spokesmen told CW that comparable AT&T rates for data transmission state that the switched network can tolerate "one error for every 100,000 bits transmitted on 90% of all calls." Bell has not clarified what the expected error rates would be on the remaining 10% of the calls.

Reliability of microwave transmitted data is appreciably greater than the system used by Bell, which includes wire, cable, and microwave facilities all interconnected.

MCA carriers will transmit all channels on dual frequencies to provide what the company says will be a "99.997% reliable communications network." In addition standby batteries will sup-

ply continuing operation in case of power failures.

Additional advantages to computer users would include the capability of transmitting digital information directly over the MCI network without having to resort to modems, which Bell customers must use to convert digital information to analog form, he said. Unlike the Bell switched network, which cannot handle digital data, the microwave facilities can directly interconnect computers at different sites.

When asked how computer users would interconnect with the microwave network, Goeken said that his company plans to apply for authorizations to permit customer interconnection using facilities in the 50 GHz frequency band. This would give users the option of using either Bell or MCA-affiliate facilities to interconnect with the microwave network. The MCA companies would use short distance microwave communications to interconnect with the customer. The 50 GHz band was chosen for its low interference characteristics, he said.

Univac Reaffirms Decision Not to Raise Prices Now

BLUE BELL, Pa. — Univac, taking advantage of the price increases announced by other computer manufacturers in connection with their decisions to unbundle or stay bundled, has reaffirmed its decision to hold the price line.

The company, which has decided not to separate the pricing of hardware and other products

"Bell has used every roadblock to prevent us from providing our service. They have acted as a self-appointed attorney general to protect what they call the public interest," Goeken said.

Goeken said that Bell had filed a petition for reconsideration of the Chicago to St. Louis authorization, claiming that the need for additional communications facilities had not been demonstrated.

He added that Bell has stated before the FCC that its primary duty is to provide service to its 110 million telephone subscribers while computer users were only a small portion of the Bell customer base.

According to Goeken, the MCI carriers will be in business primarily to provide communications facilities to its customers of which a large percentage are expected to be computer users.

He said that contrary to the Bell claim that there was little demand for additional communications facilities, his firm has received firm commitments from customers for more than 100 of the data channels on the approved Chicago-St. Louis link.

Medium-Scale Scientific Systems Offered by SEL

FORT LAUDERDALE, Fla. — Systems Engineering Laboratories, until recently a vendor of smallish special-purpose scientific computers (largely to the government), has announced a larger, faster medium-scale machine — Systems 86 — and a multiprocessor version — Systems 88.

Both are scientifically oriented, with fast access and execution of 32-bit words. Cycle time is rated at 600 nsec, with fixed-point add, load, and store operations on operands of up to one word taking 1.2 μ sec.

The basic system has 16 primary (selector) channels that can support the full aggregate data rate of 1,666,666 word/sec, either split over several channels or with one channel temporarily monopolizing the system's power.

The new machines have two types of multiplexers, both of which are applied to a primary channel. The communications multiplexer offers a 16-way split, with the sub-channels connectable either to local terminals, or, via modems, to remote devices. Data rates of up to

4,800 bit/sec are supported.

The data acquisition and control multiplexer can handle up to four concurrent high-speed transfers, the company says.

SEL is offering a line of peripherals for the new systems that includes movable and fixed-head disks, magnetic tapes, line printers, paper tapes, and card devices.

Software scheduled for first system deliveries (expected in January, 1970) include: an assembler and a macro assembler designed for real-time use; a Fortran IV compiler said to exceed USASI specs in areas including real-time and some scientific uses; Basic, in a multiterminal version; and hardware diagnostics. The company also plans a Cobol compiler.

Systems 86 is priced to sell for between \$150,000 and \$1,000,000 or more. A configuration with 32K words, floating point arithmetic, a 24 million-byte (not word) disk, two magnetic tapes and control, a 1,000-card/min reader, and a 600-line/min printer is priced at \$350,000.

Data Base Management System Offered by ISD

(Continued from Page 1)

data-base handling problem.

Problems Large

The problems of using a data base, as Stanley Madeloff, company president, points out, "are incredible, even with the simplicity of our system. Once you decide to use this approach, then you must plan all the steps necessary for conversion, carry out the conversion, and determine the types of uses you want to make of the completed data base. It's not just a matter of thinking about the problem!" He said that, though the cost of such systems is inherently high, a company can justify such a system easily if company operations could be made simpler, quicker, or cheaper through this type of large-scale access to needed information.

Some of the specific areas Madeloff pointed out as promising included the publishing industry (where he has been using the process for several months

during its development stages), the legal profession, large manufacturing firms, government and municipality operations, financial firms, and, of course, firms selling information for a price.

The system can, with proper instruction, distinguish between the use of China as a country or china as dishware. This type of semantic recognition is achieved through the manual phase of the data conversion and with careful editing. The company and the potential customers contacted felt that this was a unique aspect of the process and offered possibilities for specific applications not previously possible, particularly in the publishing areas.

The company is making the process available either as a service or for in-house users, Madeloff said. The company is obtaining larger computer facilities within the next few months to permit the support of multiple data bases and will handle any size or type of data base desired, it says.

System/3 Gets Some Competition

(Continued from Page 1)

tape cartridges (each having two tapes), a 64-character keyboard, a 30-char/sec printer, and a 500-card/min reader. A 100-200-line/min printer is optional, as is paper tape I/O.

A 2,500,000-character disk is also optional. It is rated at 30-msec average access and 156,000-char/sec transfer. As of now, disk software is limited to I/O and data transcription, but random access is said to be

included.

The tape is recorded serially, rather than frame-by-frame. The transfer rate of 6,000 bit/sec should be translated to 666 char/sec if it is to be properly compared with tapes offered by major manufacturers on their "starter sets."

The company expects to start deliveries this fall to selected customers in Western Michigan. Production of 100 units is scheduled for 1970.



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Half-Way Measures Taken to Protect National Data Bank for Migrant Children

By Joseph Hanlon
CW Staff Writer

LITTLE ROCK, Ark. — The National Data Bank for Migrant Children will make data available only to state directors of migrant education. But the state directors apparently will be able to give the information to anyone who has access to other school records. Such persons will include prospective employers in at least one state.

When completed in April, 1970, the computerized data bank will contain records of 300,000 migrant children. Children of migrant farm workers move frequently, and the purpose of the data bank is to speed enrollment of the children in new schools after each move. Under the plan, when the child registers in a new school, the school will call its state director of migrant education, who in turn will call the data bank for the student's record. This will be passed on to the school. When the child leaves a school, his record will be updated.

Originally it was stated that access to the data would be unrestricted [CW, Aug. 20]. At a Sept. 5 meeting, the committee on student record transfer of the National Conference of Directors of Migrant Education issued a policy statement that said: "The information disseminated . . . will be available to the U.S. Office of Education and state educational agencies. State educational agencies . . . will be responsible for safeguarding the information received to protect personal privacy. State educational agencies are encouraged to use the same regulations and procedures followed in disseminating other academic and school health records information in their respective states."

Joe Miller, director of the data bank, said that he interpreted the statement to mean that state

educational agencies could release information only to schools, and not to private parties. But Lee Lopez, California director of migrant education and chairman of the committee on student record transfers, said that California would release information from the files to anyone who had access to individual school records.

In particular, Lopez said that he would release information to persons identifying themselves as prospective employers, and that he would include derogatory information such as negative character traits. "I'm sure this information would be given out to prospective employers," he emphasized.

Massachusetts, on the other hand, plans to release information only to school districts, and prospective employers would have to get the information from

the last school that the student attended.

Information will be entered into the data bank through a standardized "uniform migrant student transfer form." The form includes normal questions such as academic achievement on standardized tests, physical health, vaccinations, etc. It also includes results of IQ tests and psychological tests and may include comments such as "short attention span." But the form does not have provision for general personal remarks or deprecatory comments such as "lazy."

The data bank is being set up by the federal programs division of the Arkansas Department of Education under a \$426,150 grant from the U.S. Office of Education. As part of the program, a Wats line will be maintained so that directors of migrant education can call free.

Mini-Computer Available With Bells and Whistles

WALTHAM, Mass. — Another new entry in the mini market, called Spiras-65, is designed to be useful to the end-user without the need for a substantial contribution of software or peripheral hardware at the OEM level.

The manufacturer, IRA Systems, Inc., has priced the basic processor at \$14,900.

This buys 4K of memory, with a 1.8-usec cycle time over a 16-bit word, 10-station interrupt party line I/O devices, and a read-only memory.

A read-only memory handles a good deal of the system's large instruction repertoire, including arithmetic, conditional, and block transfer I/O instructions; interrupt and address handling functions; and bootstrap loader.

Working from the basic assembler, IRA has built a macro assembler for user convenience. Other no-cost software includes a Fortran IV compiler (which requires an additional 4K, costing \$5,400), an operating system with link loader, debugging routine, I/O library, diagnostics, source and object program editors, and a math routine library.

The company, located at 332 Second Ave., accents its end-user

interest by offering a line of peripherals, including data converters, magnetic and paper tape devices, a line printer, a card reader, and small but fast disks with capacities from 8K to 256K words. The company buys those OEM, but makes its own communications terminal, the IraScope data editing display.

The panel of the Spiras-65 is user oriented. It includes a Nixie tube display which is switch-controlled to show register and memory location contents and can also be used to alter memory contents. It displays in decimal characters, rather than octal or hexadecimal.

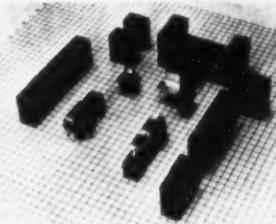
The company suggests applications including terminal control and data concentration, industrial uses in control and data acquisition, commercial work, and biomedical monitoring.

IRA has designed, and is selling, two things intended to make it possible to write programs for the new machine before it is delivered. One is a 360 assembler, which allows Spiras programs to be assembled (with Spiras-compatible object code produced) on 360s of Model 30 size and above. The other is a 360 simulator, which gives program simulation.

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Teletypewriter Units Sends/Receives at 240 char/sec

MOUNTAIN VIEW, Calif. — A hard-copy printer (a modified IBM Selectric typewriter) and an electronic data transmission terminal with features including a specially designed tape cartridge are available for business data communications and teleprocessing systems.

The system, known as Novar 5-50, will prepare hard copies of business papers while simultaneously making digital copies for high-speed transmission by tape cartridge over regular telephone lines to a remote computer or to other terminals in the same system.

One of the features of the Novar 5-50 is its high-speed data transmission capability of 240 char/sec, compared to a maximum of 15 char/sec for competitive equipment, says the company, Novar Corp.

In a basic three-minute transmission period the 5-50 can transmit 43,200 characters, according to the manufacturer.

Teletype transmission of the same amount of data would re-

quire 72 minutes, the company says.

The terminal can take advantage of the difference between day and night transmission rates by its ability to operate in unattended mode.

An operator is able to enter data on tape, leave the terminal, and have the data automatically



transmitted by polling from a central computer.

Another feature of the Novar 5-50 is automatic error correction.

A special electronic circuit monitors each transmission for any errors introduced by equipment malfunction or telephone circuit noise.

When an error is detected, the transmitting machine is automatically instructed to retransmit the erroneous portion of the data in correct form, the company says.

The system has a buffer, enabling an operator to spot errors on hard copy and perform corrections before transcription to magnetic tape.

The carriage return key activates data transfer to tape. Transmission to the computer can be initiated either by the operator or by a computer.

The company, located at 2370 Charleston Road, prices the unit at "under \$6,000."

This includes a modified Selectric typewriter, the tape cartridge (which can hold up to 48,000 characters), and a modem, which provides interface to the communications line.

Interface

HAWTHORNE, Calif. — A device that interfaces with IBM's 029 keypunch unit to allow transcription from paper tape to punched cards is now available.

The Model C780 can be field installed, according to the developer, the Systematics division of General Instrument Corp.

The unit can translate 5-, 6-, 7-, and 8-level code tapes and produce cards coded in 128-charac-



ter ASCII, including upper and lower case.

The company, located at 13040 S. Cerise Ave., says that the device operates at 20 char/sec with the non-print 029 and at 18 char/sec with the printing model.

The device does not exclude the use of the 029 as a standard keypunch unit, when desired.

New Products

The basic unit has 12 selectors, 12 distributors, and four collectors, for programming flexibility, and can be equipped with an additional six selectors and 12 distributors.

The unit is available for 30-day delivery, sells for \$4,300 and leases for \$160 per month.

Disk Memory

GLENDALE, Calif. — A small (500,000 bit), inexpensive (\$2,700 in single quantity) disk storage memory unit is being offered by Singer-Librascope.

Model L107-8-4 is a flying head-per-track system that features an average access time of about 19 msec, figuring on a rotational speed of 2,600 rpm, says the company.

The manufacturer, located at 800 Western Ave., says the price includes read/write and head-select electronics.

The firm will design computer interfacing circuitry, but says that the cost will be prohibitive at single-unit volume.

The unit is essentially aimed, therefore, at OEM and large end users, where volume will make the unit cost of interface feasible.

Applications will include mini-computer use (particularly for software, where access speed may be a large advantage) process control, automatic test and checkout systems, buffer or display systems, and extension to core.

The company is quoting delivery in 30 to 45 days.

Magnetic Inscriber

MINNEAPOLIS — The 150 magnetic data inscriber, a unit that records data directly on magnetic tape at the point of origin or at a central keying location, is available. The tape is contained in a compact, self-threading cartridge compatible with IBM 360 systems.

After recording, data may be pooled onto IBM-compatible

high performance tape for direct entry into major computing systems, or an IBM 2495 tape cartridge reader may be used to transfer data from the cartridge into a computer, according to the manufacturer, Data Action Corp.

Data is entered on the tape by means of a standard keypunch keyboard. A program drum and card that can store up to eight program levels are used for data entry and formatting. Record length is variable.

A true English-language display of the last character or number recorded is presented upon operator command. If the operator



senses a mistake, she may check the character and immediately correct the error.

Field duplication and skipping are performed at 120 char/sec. Both operations can be initiated from the keyboard if desired.

A tape pooler, Model 500, for transferring data from the cartridges to computer-compatible tape is also available. The pooler reforms data eliminating the necessity for a separate formatting function by users.

Transmission capability can be added to the system by the use of standard data modems for high speed data communication over telephone lines, according to the company, which is located at 4575 W. 77th St.

The 150 magnetic data inscriber is priced at \$5,900. The unit will be leased at \$145 per month including maintenance. The tape pooler is sold as a package with three 150 data inscribers.

Price for the total package is \$490 a month. Deliveries of both units begin in Jan., 1970.

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WHY PEOPLE KEEP BUYING INTO A VANISHING BUSINESS.

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Despite what the tea leaves have said, it takes a service force of 1,000 to keep our customers happy. In the last eight months we processed 1,300 machines at our reconditioning plant.

That hardly sounds like rushing into extinction, and it isn't. But then, the unit record business is used to being called passé. Fifteen years ago the IBM 650 and the 705 were introduced and punched card equipment

was supposed to slip quietly into the Smithsonian.

Now it's the System/3 and the hot shots are saying our only chance is to replace the abacus in Chinese laundries.

The unit record business has changed all right. But *changed* is not gone. At last count, there were over 40,000 unit record installations in this country. Punched card consumption goes up every year. Many companies, large and small, still rely entirely on punched card equipment for economical data processing. Others have found the machines serve well for back-up, and

computer editing. Much as the IBM 1401 (remember when that vanished?) is now being used in conjunction with more sophisticated computers.

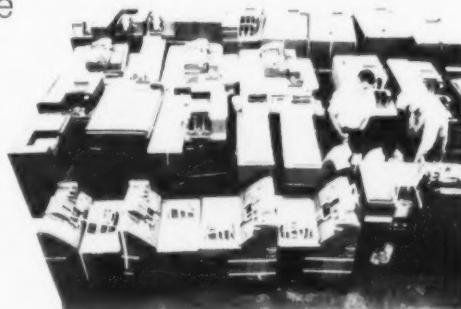
And if you think the only people left in the unit record business are the brokers, you might get in touch with one of our sales representatives. He will

assess your data processing requirements and recommend the

right machines to do the job. You can rent them short or long term. Or you can buy them. Or both. However you choose to do it, we can save you money on any combination you want.

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Editorials

A Cruel Trick

A group of well-intentioned computer professionals has just played a cruel trick on 11 black people. With the best liberal intent, they taught a nine-month, two-night-a-week course for underemployed blacks. When the course was completed, the students were told that they were qualified for jobs as programmer trainees. Of 12 who graduated, only one got a job through normal channels as a programmer trainee.

The instructors were surprised. They shouldn't have been, because this has happened before. No matter what we believe the situation should be, jobs as programmer trainees are much sought after and are open primarily to college graduates who get high scores on aptitude tests.

The underemployed blacks, even with 80 evenings of compensatory education, cannot compete equally with college graduates or even with computer school graduates, many of whom have had six months of full-time training. Last week Honeywell announced a nine-month three-night-a-week training program, but it is restricted to "the exceptional high school graduate" who gets high scores on a Honeywell aptitude test.

Lower-level jobs, such as computer operator, are available. We've misled enough people. Let's train the underemployed for the jobs that are available now, not the ones we wish were available.

But It Needn't Have Been

It is unfortunate that the above editorial needed to be written. We are still hiring test scores instead of people, despite evidence that the IBM Programmer Aptitude Test is a poor indicator of a business programmer's potential.

One of the exceptions to this otherwise bleak picture is Xerox. It has accepted people without the normal qualifications into its programmer-trainee programs. After the three-month program, "you can't tell them from the others," according to a Xerox spokesman.

We have a responsibility to take a few "high risks" into programmer-trainee courses. We believe that someone who appears to be a "high risk" because of a lower test score will not really be a risk at all if he has proven himself in a compensatory course.

Companies must make a commitment now to hire a certain percentage of persons who are now underemployed. With that guarantee, compensatory education programs can be safely resumed.

Growing Pains

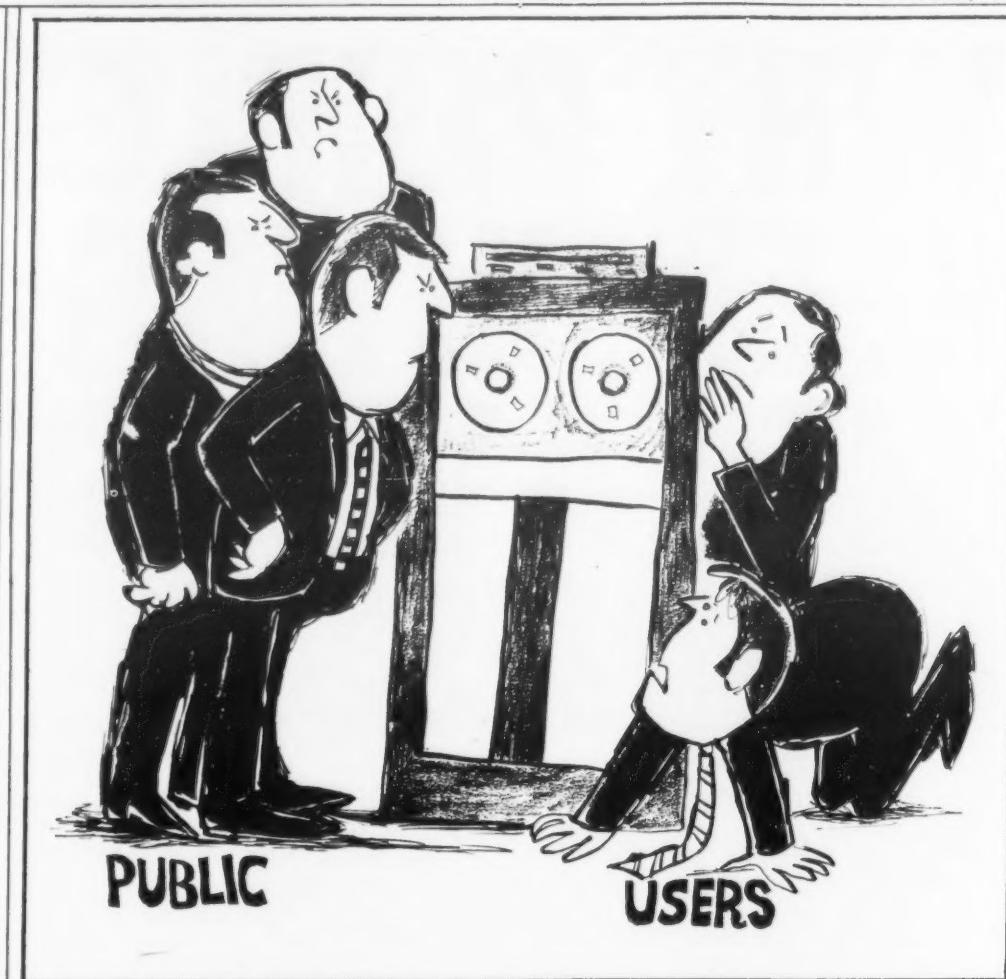
With this issue CW completes another cycle of growing pains.

Having outgrown the capacity of its third printer in the Boston area, CW is now being printed in Chicago and distributed from there.

Readers may notice a slight change in the size and appearance of the newspaper. The major changes are not as noticeable. The greater capabilities of our new printer, plus the fact that we will be distributed from the Midwest, will enable us to bring the latest news to you as much as three days sooner.

CW would like to express its thanks to you, the readers, who have so enthusiastically accepted the newspaper and who have, in two short years, made CW the leading publication for computer users.

The growing pains you have given us are most welcome.



"But Our Output Is Accurate Most of the Time!"

Letters to the Editor

CW Editorial Viewpoint Called 'Irresponsible'

Subject: Your editorial, "No Middle of the Road" [CW, July 16].

This type of editorializing is irresponsible. The very fiber of this country is assailed by such unreasoning drivel. Perhaps the populace is becoming sufficiently accustomed to these mixtures of faction and fact, of half truth and truth, and of emotion and reason that they will ignore it. I feel compelled to ask you to cease and desist.

First, you might be surprised to learn that there are many ways in which a private citizen can make his voice heard. He can vote. He can participate in politics. He can write, telegram, call, and even visit elected officials, etc. Your role as a "blind German" (an exceedingly offensive phrase) is a matter of choice.

Secondly, once you have done what you can within the established framework to elect the officials and determine the policy of your choice, the future of the American System demands that you act in support of the government. That you disagree and voice these disagreements is a problem for you and your conscience. If you act out these disagreements, the society must react firmly whether you assassinate the President or fail to program a war game.

Third, John Q. Citizen does not have all of the facts that are available to Richard Nixon on issues such as the Vietnam war. If he had, he might make the same decision (four Presidents of different political leanings have made essentially the same commitments).

Fourth, you're right! No one can be apolitical at this time. However, the fastest road to total disorder is for each of us to act out his own decisions and inclinations with respect to each of the questions under consideration. Loss of personal freedom is an inescapable consequence of social order. This price is high, but to refuse it is to refuse society.

Finally, your right to say what you believe is undeniable. I question the wisdom of Computerworld's owners and readers for providing you with a vehicle for such editorials.

George S. Innis
Director of Computer Services

Texas Technological College
Lubbock, Texas

Innis says we have a right to say what we believe. We, in turn, believe he has a right to say what he believes.

But we object when he resorts (in the second paragraph) to the old political stunt of attacking a viewpoint with emotion rather than reason. And we strongly object to the fact that he twice (in the second and last paragraphs) implies that our voice should be muffled. Ed.

CW Cited for Recognizing Danger to National Welfare

A friend of mine recently called my attention to Computerworld and particularly to the issue of July 16 and its editorial, "No Middle of the Road."

I want to convey to you my congratulations for publishing such an important editorial and for calling attention to the dangers of making long-range commitments at the planning level of military and massive civilian programs. It is reassuring to know that you recognize the danger to our national welfare by applying such simple propaganda techniques as claiming: "The proposition is valid and feasible because it has been checked on a computer."

The enclosures will give you some indication of my interest and concern in the area of engineering planning in the modern technologies, particularly atomic power. The real problem in the engineering profession, as indicated by the editorial in IEEE Spectrum, is the fact that it is practically impossible to get a controversial article published in a reputable professional journal.

I hope you will keep up the good work!

Adolph J. Ackerman
Consulting Engineer

Madison, Wis.

Computerworld welcomes comments from its readers. Preference will be given to letters of 250 words or less. Computerworld reserves the right to edit letters for purposes of clarity and brevity. Letters should be addressed to: Editor, Computerworld, 797 Washington Street, Newton, Mass. 02160.

Black Trainees - Part III

Course Sponsors Didn't Foresee Placement Problems

By Joseph Hanlon

CW Staff Writer

BOSTON — "It was naive of us to teach them a course and assume they would be hired," commented Charles Martin.

Taught by volunteers from a large consulting company, the course attempted to prepare underemployed blacks for jobs as programmer trainees. But of 12 graduates, only one got a job through normal channels as a programmer trainee.

The group may have been naive in two areas: what the course should be, and what was required to get jobs for the graduates.

According to Martin, who organized the course, the graduates are "fully qualified for any sort of training." But a DP manager who rejected the number two student (telling her that she was a poor job risk because her husband might move) told CW that her background was "woefully inadequate."

A spokesman for another company who interviewed one girl said that she "had no basic understanding" of computer programming, and charged that the course does not teach "what industry requires."

A large Boston company which hired two of the graduates of the course last year did not hire any this year. An employment representative of the company said that the people hired last year "are doing adequate

work. But we are not looking for career programmers. We want people who can be designers, and they are not capable of moving up to be designers."

Sponsors of the course concede that there may have been problems. There was essentially no screening of students. Jobs Clearing House, a Boston placement group working for better jobs for ghetto residents, proposed the course and recruited the students. The teachers took nearly everyone supplied by Jobs Clearing House. The result was that students ranged, according to one instructor, "from high native intelligence down to a bump on a log."

Twenty-five started the course. Twelve finished. The same instructor said: "Those who passed had the best native intelligence, and all who passed had a high school degree."

He conceded that by taking a group with such varying abilities, the sponsors may have had to lower the level of the course, thus hurting those who did best.

Testing was another problem. The students had trouble getting jobs partly because they did badly on tests. The teachers of the course argue that test taking is a learned skill, and that their students were poor test takers. Yet the students were not given experience in test taking during

the course; ranking was done by personal judgment of the instructors.

In addition, no attempt was made to prepare the students for the sort of tests they would have to take when they applied for jobs.

But the most obvious failure on the part of everyone was the lack of understanding of how difficult it would be for students to get jobs. Under the original agreement, the volunteers from Arthur D. Little were to teach the course, and Jobs Clearing House was to select the students and help place them afterwards.

Both teachers and students were critical of Jobs Clearing

House. "They started too late to try to find jobs for us," complained one student. As a result, students had to make their own contacts, and go in cold for interviews. As one instructor said: "Sending those people in cold was like throwing them to the dogs."

The teachers admit that even if it was not their official responsibility, they should have made more of an effort to place the students through personal friends. Martin concluded: "To place these people, you have to short circuit the personnel office. We really should have had a totally separate group nurturing jobs for the students."

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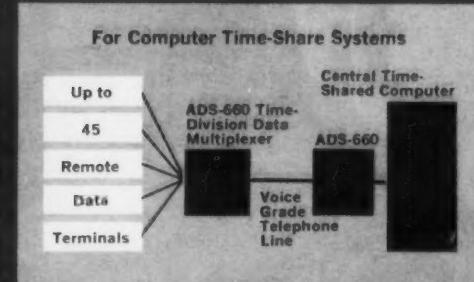
MINIMIZE TELEPHONE COMMUNICATIONS COSTS. Put from one to 45 remote customers on line to a central computer anywhere in the USA — whenever they want time on the computer. Equipment costs are lower because the ADS-660 uses state-of-the-art solid state design to provide a basic character-interleaved multiplexer capable of handling virtually any combination of inputs without accessory interface equipment.

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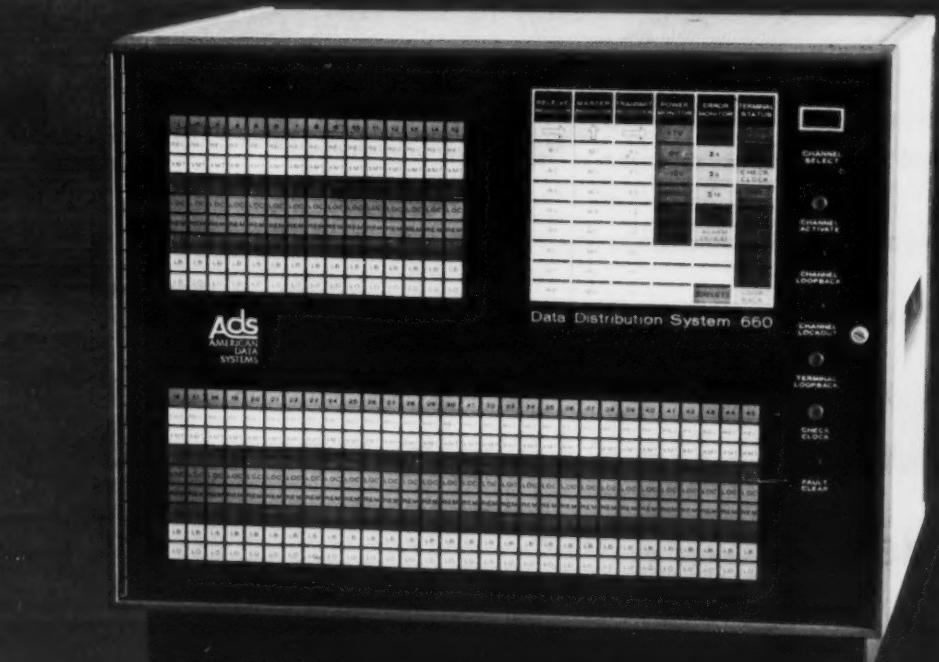


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MCI Affiliate Files for 2nd Data Link

WASHINGTON, D.C. — MCI New York West, a newly formed affiliate of Microwave Communications Inc., filed an application with the Federal Communications Commission on Sept. 17 to provide special service common carrier microwave facilities from New York to Chicago.

The application by MCI New York West came less than a month after the FCC set a precedent on Aug. 14 that licensed MCI to provide customized microwave service between Chicago and St. Louis.

The FCC decision marked the first time that a private company has been allowed to compete with existing regulated common carriers (AT&T) in supplying private line communications services.

In commenting on the applica-

tion, an MCI New York West spokesman said, "We believe that since the FCC has authorized this service in one area, we will receive authorization for additional communications links in this [N.Y.-Chicago] and other areas."

Thor W. Kolle Jr., chairman and treasurer of MCI New York West, said the proposed customized communications carrier would give private users far greater flexibility in selection and use of channels at rates less than half those now being charged.

"Compared to only three channels now available for point-to-point service from existing common carriers, MCI New York West will offer 72 basic channels that can be utilized in over 10,000 various combinations to

meet the exact needs of each subscriber," Kolle said.

As proposed under the application, MCI New York West will provide customized communications service for the first time from New York to Chicago along routes that include such major cities as Philadelphia, Pittsburgh, Cleveland, Buffalo, Rochester and Albany.

Typical uses of the MCI system would include instant access to computer information centers, transmission of data, and other communications.

Users may purchase part-time or one-way use of channels, and transmit various types of signals without any restrictions. Up to five organizations will be permitted to share a single channel, in order to accommodate the smallest communications users.

COMPUTERWORLD

communications

Logic Backboards Wired Via Communication Units

By Ronald A. Frank

CW Staff Writer

SAN DIEGO, Calif. — Communications-oriented key-to-tape input devices are being used as part of a transcontinental computer-controlled data link that automatically wires logic backboards.

The system being used by the EDP division of Honeywell connects the company's Keytape production facilities here with an H-800 computer installed at the engineering center in Waltham, Mass.

When West Coast design engineers determine the required logic parameters to be included in a computer peripheral unit, the data is entered by an operator into a Keytape device which automatically transfers the information onto magnetic tape.

The tape containing the logic design parameters is then transmitted across the country by a Bell Wats line at 1,200 baud and automatically reproduced on a second Keytape communications device in Waltham.

In commenting on the system, a company spokesman said that the data transmission enables the San Diego facility to use the data processing facilities in Waltham with a minimum of effort.

Turn-Around Reduced

"The communications link has reduced our turn-around time with Waltham from about 14 days to 4 days without sacrificing any engineering or processing time," he said.

The data on the Waltham tape is entered into the 800 system using standard Honeywell tape drives that are compatible with the tape transports in the Keytape units.

The design parameters are processed on the 800 system using software generated by the company's design automation group.

When the required backboard wiring has been determined using the specially designed software, the 800 system generates a series of files on tape which is transferred to the nearby Keytape communications device and transmitted back to San Diego where the data is assembled on the originating Keytape unit equipped with special output attachments.

As the magnetic tape of the transmitted data is generated, a simultaneous hard copy of the required point-to-point wiring is produced by a printer.

In addition an allocation chart giving the exact location on the backboard of each circuit module is printed.

Finally, the tape records are processed into a card deck that is used as an instruction file for a Gardner-Denver automatic wiring machine that actually runs the required wires and connects them to the backboard.

Data Compression

During the transmissions a special data compression software package, called Scrunch, is used to eliminate any blank characters.

Since the Keytape communications units normally process 80-column card-image records, the Scrunch program batches all records for transmission, automatically dropping unused character positions such as spaces and blanks.

After the compressed records are transmitted, the program allows the receiving Keytape unit to reconstruct the original card-image records.

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the computer industry's first **key-to-disc** data input system accepts the output from 60 or more key stations simultaneously

Time-shared input cuts data preparation costs 50%.

Now you can cut your computer input costs in half. This new innovation in data preparation techniques gives you two money-saving advantages over conventional keypunch or one-keyboard-one-magnetic-tape-per-operator systems: (1) the LC-720 employs a computer time-shared input; (2) it is the only system available that provides data output directly on IBM/360-compatible magnetic disc.

By time-sharing the data from 60 or more keyboard operators simultaneously, significant savings in data station costs of as much as 50% can be achieved. Costs drop to as low as \$4300 per data station for a typical 60 station system. For large data preparation installations, the time-shared input is the only economical way to go.

Data entered into the LC-720 is processed by a small digital computer and stored on an IBM/

360-compatible magnetic disc that provides the advantages of bulk storage and high speed random access of data. The problems associated with punched card handling or the mounting, pooling, merging and unmounting of magnetic tape reels are eliminated. All data is conveniently and economically stored in an IBM 1316 disc pack for direct high speed input to your modern data processing system. Naturally, an IBM/360-compatible magnetic tape is also provided with the system as standard equipment.

The LC-720 KeyDisc System also offers for the first time, data verification requiring one input pass only through the system, in addition to the normal technique of verification requiring two different operators. Record size is infinitely variable by each operator from 1 to 120 characters long and the system stores a large library of 30 or more different format control programs, all available simultaneously to any and all operators.

LC-720 KeyDisc System

Bring your own data for a demonstration

Logic Corporation invites you to see an operating demonstration of the LC-720 KeyDisc System at the company's premises. Bring your own original data and Logic will provide a reel of magnetic tape of the output of your data from the LC-720 for later printout at your own computer facility.

To arrange for a demonstration, contact Gary Tischler, Director of Marketing (201) 334-3713

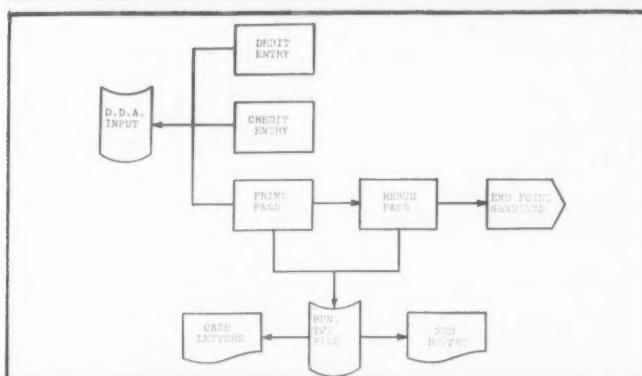
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October 1, 1969

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System and report flow within the Shawmicr dual-micr demand deposit system.

10 Lines of 'Work-Ten' Said to Equal 200 in Cobol

PHOENIX — "Often a programmer has to write as few as ten lines of Work Ten to generate what used to take him 200 lines of Cobol," according to Ray Work, National Computing Industries director and the developer of the file management and reporting system.

There are only three programming steps with Work Ten, the company says. The programmer specifies the particular data that he wants used, the function to be performed, and the controls to be used.

The package then selects the appropriate files description, data description, and environment information; details the Cobol statements; and produces a narrative describing the records used, files accessed, and logical functions requested, the company claims.

'Digitax' Expands Service With Nationwide Network

GREENVALE, N.Y. — Digitax, an income tax preparation service available for the NYC area, has expanded operations to a nationwide basis, according to the company.

All required data is submitted in prescribed "forms," actually resembling questionnaires, and is then reviewed by tax experts.

Information is then transcribed for optical scanning and fed into a computer where tax detail figures are prepared.

Turnaround processing is provided within 48 hours, according to the company, as opposed to nine days with a previous system.

The service is available for brokerage house tax analysis, banks, lawyers, and CPAs, the company says. Offices are at 14 Plaza Road.

Users Keep Their 'Wits'

PITTSBURGH, Pa. — Westinghouse interactive time-sharing users now have access to a large applications and subroutine library through the company's Wits system.

Providing Basic and Fortran IV, Wits offers specialized programs in the areas of engineering, finance, general business, critical path analysis, mathematics, statistics, and linear programming. The company's address is P.O. Box 868.

The program appears to have a report-generation capability that eliminates most of the work associated with report formatting and field editing.

The Work Ten file management language is available through the company's offices at 3003 N. Central Ave.

'Artic' Permits Cobol-Based Teleprocessing

By a CW Staff Writer

DALLAS — A control system for applications operating in an inquiry environment, originally developed to allow more efficient use of certain proprietary packages, is available to 360/30 and 360/40 users.

The system, called Artic (Associometrics remote terminal inquiry control system), is said to provide DOS users with an effi-

cient approach to the technical software requirements of a teleprocessing system while allowing the applications to be written in a high level language such as Cobol.

Artic supports Teletypes, audio response units, CRT terminals, and the IBM 2740 terminal, an Associometrics spokesman said. To expedite inquiry processing, the system uses the multitasking

Business-Oriented Time-Sharing Package Is Announced From CCA

By a CW Staff Writer

ENGLEWOOD, Colo. — A modular, business-oriented, time-shared software package for general business operations has been developed by Computer Corp. of America, Inc.

Written in Fortran IV, the package is claimed to operate on any time-sharing system that will support Fortran IV. It is being sold on an individual module basis.

Some of the various modules included are: accounts receivable, accounts payable, cash

disbursements, payroll, general ledger, profit and loss statements, inventory, and several additional features for management control reporting, the company said.

The Time-Sharing Business Package is designed to be marketed to commercial time-sharing service bureaus, the company says.

The company providing training seminars for customers of the new package. Offices are located here at 3385 S. Bannock St.

Money-Market Followers Can Now Keep Track With Citibank System

NEW YORK — First National City Bank is offering correspondent banks a new money market information service that provides data from the bank's Wall Street call boards on a daily basis.

A special feature of the new program, one of 30 Citibank is making available through its financial network service on a computer telecommunications system, comments on money market developments by senior bank officials.

"This is the first time that a

comprehensive service of this kind has been offered nationally through a computer-based, time-sharing network.

"Time-sharing enables us to offer the service at a low cost," Senior Vice-President E. Newton Cutler Jr. said in announcing the new service.

The Citibank program provides information on a broad range of money market instruments, as well as negotiable certificates of deposit and quotes, together with developments in the foreign exchange area, the bank said.

Twin-Micr Is Supported On 360 Under DOS With New 'Shawmicr'

By a CW Staff Writer

BOSTON — Shawmicr, a program featuring changeable sort patterns and adjustable float factors for S/360 magnetic ink character reader customers, is available from Cullinane Corp.

Priced at \$15,000, the package was developed at National Shawmut Bank of Boston and will handle two 1419 Micr sorters from a single 26K partition.

Output is produced for the selective tape lister, an optional feature of the 1403 printer.

Transit distributions for volume entries is accomplished during the first pass of the documents, the company says.

Each pass also produces a master listing for proof of batches, with totals by block, deposit, and batch.

A detail tape is generated, the company says, providing control details for each sort pocket. Batch difference recap, pocket cut recap, reject statistics, and

run totals are produced as output from the program.

A disk input file for a bank's demand-deposit system is produced, plus a generated float and item count for all deposits, based on the transmittal/routing of the deposit slip.

The sort and float tables are catalogued separately to permit ease of updating.

Built-in benefits include disaster protection, elimination of reruns larger than a single block, and coding of transit data files to prevent writing on a live file, the company says.

The \$15,000 price includes complete documentation, installation manuals, maintenance, and training. The company's offices are at 60 State St.

IBM Subsidiary Releases Arithmetic Training System

CHICAGO — A \$9,000-per-year arithmetic learning aid for the S/360 is available from Science Research Associates, an IBM subsidiary.

The arithmetic proficiency training program (APTP) combines diagnostic tests with individually prescribed practice to

help students in the first six grades to learn mathematics, the company says.

The package is supplementary and can be used with either traditional or modern math instruction, according to Richard A. Giesen, company president.

The program is designed, Giesen said, to give a student a diagnostic test to determine his proficiency level and then provide practice problems at the lowest level of skill yet unmastered by the student.

The program is also designed to notify the teacher of areas in which a student has exceptional difficulty or fails to maintain his pace of improvement, he continued.

The arithmetic skills covered include addition, subtraction, multiplication, and division of whole numbers, fractions, mixed numbers, and decimals, with conversions from one kind of number to another and percentage problem solving.

The program requires a 360/30 or larger and uses ordinary teletypewriter terminals, according to the company.

The \$9,000 price includes a one-year license for use of APTP. SRA is located at 259 E. Erie St., here.

FCI Offers Facilities Management

NEW YORK — Complete computer site-planning, design, and construction on a turnkey basis is being offered as a service from Facilities Construction Inc.

The company has been in the data processing site-installation field for several years.

The service includes the initial planning stages, during which space is allocated and physical plant facilities are considered.

Climate control, mobile walls and partitions, raised floor planning, fire and detection protection, control and computer wiring, soundproofing, lighting, and building alterations are all considered, with associated contracting to produce the final design.

Among the existing customers are Lehman Brothers, RCA, and ITT World Communications, all of New York City.

The company claims familiarity with many manufacturer's equipment, including IBM, NCR,

Honeywell, Burroughs, and RCA. The company offices are at 11 E. 20th St.

Autocoder-to-Cobol Service Offered

JENKINTOWN, Pa. — An Autocoder-to-Cobol translator service known as Actran is being offered by Computer Conversations, Inc. The company claims that conversion completeness ranges from 85% to 98%, depending on the degree of complexity within the Autocoder source program.

The resulting programs, the company says, can be run on either the S/360 (DOS or OS), the Spectra 70, or the Burroughs 5500.

The service is being offered for a minimum of \$50 plus an additional 20 cents per Autocoder or SPS source statement. Company offices are at Benjamin Fox Pavilion here.

1401, 1410, 1440 FOR SALE

IPS has several IBM 1400 series systems for sale or lease. Included are a 1401 40K tape system and 80K CPU, 1401 4K and 8K card systems, 1401 8K to 16K tape systems, 1401's with 1311 discs. Inexpensive 1401 D-3 (tape-to-printer only) deliverable in 90 days. Three 7330 tapes available separately to add tape capacity to 1410 or 1401. 1440's with 8K to 16K core, 2 to 5 1311's. For price, delivery and detailed specifications, please write or call.

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AMA Introduces Computer Problem-Solving Course

NEW YORK — A one-week course in computer-aided management techniques will be offered by the American Management Association in Los Angeles, Oct. 20-24.

The class, "Developing Computer Problem-Solving Skills for Managers — Hands-On Direct Access Computer Usage," is directed at controllers, data processing managers, and other top and middle managers who want to complement their in-house installations with access to additional remote terminals.

Class time will be divided between lectures and laboratory experience. Proprietary programs specially prepared to aid in problem-solving will be used.

Major topics include computer programming and operation of the computer terminal; systematic procedures for solving problems; languages of instruction; and the computer and related devices.

Faculty members for the course include David E. Debeau and William C. Lynam of North American Rockwell Corp. and Andrew Vazsonyi, director of the computer center, Graduate School of Business Administration, University of Southern California at Los Angeles.

Cost of the five-day course is \$550 for AMA members; \$625 for nonmembers. Registration must be completed in advance.

For additional information, contact: Course Registrar, AMA, 135 W. 50th St., New York, N.Y.



1970 IEEE COMPUTER GROUP CONFERENCE AND EXPOSITION, June 16-18, Washington, D.C. Technical sessions of the conference will emphasize engineering and design aspects of memories and peripheral devices.

Memories, slave computers and related technologies, data preparation and conversion, terminals and displays, testing and packaging, and systems configuration management have been identified as tentative topic areas by the conference committee.

Papers covering new contributions, the state of the art, projections, evaluations, applications, or surveys in these areas are solicited. A prize will be awarded the best paper submitted.

Papers should be double spaced, with original drawings and photographs keyed to the text.

Send five copies of a preliminary draft, not to exceed 6,000 words, and a brief summary of essential points and conclusions of 100-300 words to T.C. Foote, IEEE Computer Group Conference — 1970, P.O. Box 1727 Rockville, Md. 20850, no later than Nov. 15. Authors will be notified of acceptance by Feb. 10.

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COMPUTERWORLD

education

Honor Students Get Job Training, Managers Get Programming Relief

By Kate Rachstein

CW Education Editor

BOSTON — A work-study program that offers assistance to short-handed data processing managers while it provides on-the-job experience for honor students at a local junior college is beginning its fifth year.

It appears, however, that programmers aren't the only commodity in short supply. Despite the program's success, the number of students qualified for the program has now begun to outstrip the number of firms requesting student employees. As a result, some students have accepted lesser positions in hopes of working up to programmer status.

Last year fifteen firms participated, and all but one of them have requested one or more students from this year's program.

The student participants are seniors enrolled in the data processing curriculum at Bryant & Stratton, a coeducational school that offers two-year programs in computers and electronics, data processing operations, and business or scientific data processing.

To be eligible for work-study, the students must have earned a "B" or better average in their first-year courses.

They attend classes in such subjects as systems analysis, advanced programming, and accounting in the morning and are available for work as programmer trainees during the afternoon, evening, and sometimes even on weekends.

All have completed courses in programming, have successfully written and run several programs, and have, in most cases, hands-on experience with the school's IBM 1401. Most members of the program spend 15-20 hours per week at their job.

This year, 35 of the school's 350-400 data processing students are eligible and have elected the work-study combination.

The initial matching of student and employer is done by a Bryant & Stratton project coordinator — not a computer. However, his decision is not binding, and either the student or the employer may decide against the match after a subsequent interview.

Employers are encouraged to treat the students as they would their own employees so that the students will become familiar with the day-to-day operations of a computer installation.

Although salaries are not fixed by the school, most students receive hourly wages comparable to those of full-time employees performing similar jobs.

The student agrees to stay on the job from the time of placement — usually September or October — through June. He continues working during school vacation periods.

If, for such reasons as poor health, declining grades, or unsatisfactory performance, the student is relieved of his position, the school takes steps to find a replacement for him, insuring continuous performance to the hiring company.

So far about 80 students have begun the nine-month program; all of them have completed it.

The employer is encouraged to maintain active contact with the school and to offer suggestions for improving the project.

Placement director Richard Papantonis noted that although many students decide to continue their education at a four-year college, "many" remain with their work-study employers on a full-time

basis.

Figures from 1968 show that of 41 eligible students, 18 are now employed in the data processing and 13 decided to continue their education. The remainder is divided between military service and employment in other fields.

Of those in data processing, seven are now programmers; two are junior programmers; one is a system analyst; and seven are performing computer-related services.

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Work-study graduates Leslie George, Class of 1968, and Linda DeCarlo, Class of 1969, (center) prepare a disk pack for their programming jobs with Avis Rent-a-Car. Bryant & Stratton placement director Richard Papantonis (left) and Avis data processing manager Carl Ciuffo (right) check their progress.

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COMPUTERWORLD

societies

FJCC Group Selects Art Judges

LOS ANGELES — Two well-known figures in the world of art and a computer expert who is, in addition, a professional artist have been selected to serve as judges for the art exhibit of the 1969 Fall Joint Computer Conference.

Smith Dorsey, chairman of the FJCC's special activities committee, announced that Maurice Tuchman, senior curator of modern art at the Los Angeles County Museum of Art, and Robert Mallary, associate professor of art at the University of Massachusetts, Amherst, will team with Paul Thomas, a member of the technical staff, Autonetics division of

North American Rockwell, in selecting the top entries.

The central theme of the FJCC art exhibit is "communication between the public and the computing industry." Eligible categories include "The Artist Looks at Computing," in which scenes or abstractions must relate to computing or its implications, and "Computer-produced Art."

The public, as well as conference attendees, are invited to view the entire exhibit on Sunday, Nov. 16, and Tuesday through Thursday, Nov. 18-20.

Hardware Manufacturers to Show Latest in OCR at DPSA Meeting

STAMFORD, Conn. — The latest developments in the optical character recognition industry will be illustrated by presentations from several major hardware manufacturers at the fall general meeting of the Data Processing Supplies Association, October 27-29.

Held at the Barbizon-Plaza Hotel in New York, "Data Processing OCR Input/Output Technology" is meant to provide a meaningful educational forum for this multifaceted industry.

"Our approach to this will be unique in its drawing together of technical considerations with top-level management in marketing," said DPSA President Tom Evans.

Keynote speaker Peter McCloskey added, "Interest in optical readers today, as well as forthcoming developments, has produced an intense public awareness of

the subjects which will be covered in considerable depth at the DPSA meeting."

Among the topics to be presented during the meeting are: IBM's 1287 application experience, new dimensions in OCR through the 1288; Recognition Equipment's Electronic Retina computing reader, Ink Jet printer, and the Input Reader 2 system; and Control Data's remote terminal reader, 915 page reader, 935 document reader, and applications for these devices.

Each OCR hardware presentation will include an example of an OCR application by a user from the airline, retail, utility, or distribution industry. These will be followed by a forms considerations commentary from the viewpoint of the forms manufacturer.

In addition, the DPSA applied research subcommittees will analyze each of the presentations from their respective spheres of responsibility.

Complementing the OCR hardware displays, the DPSA plastic card division members, including Datron Systems, Inc., I.C.V. Inc., Identification, and Synergistics, will cover their terminal equipment.

C.A. Greathouse, executive director, can be contacted at the Data Processing Supplies Association, 1116 Summer St., Stamford, Conn. 06904.

DEC Indac-8 Among ISA Show Exhibits

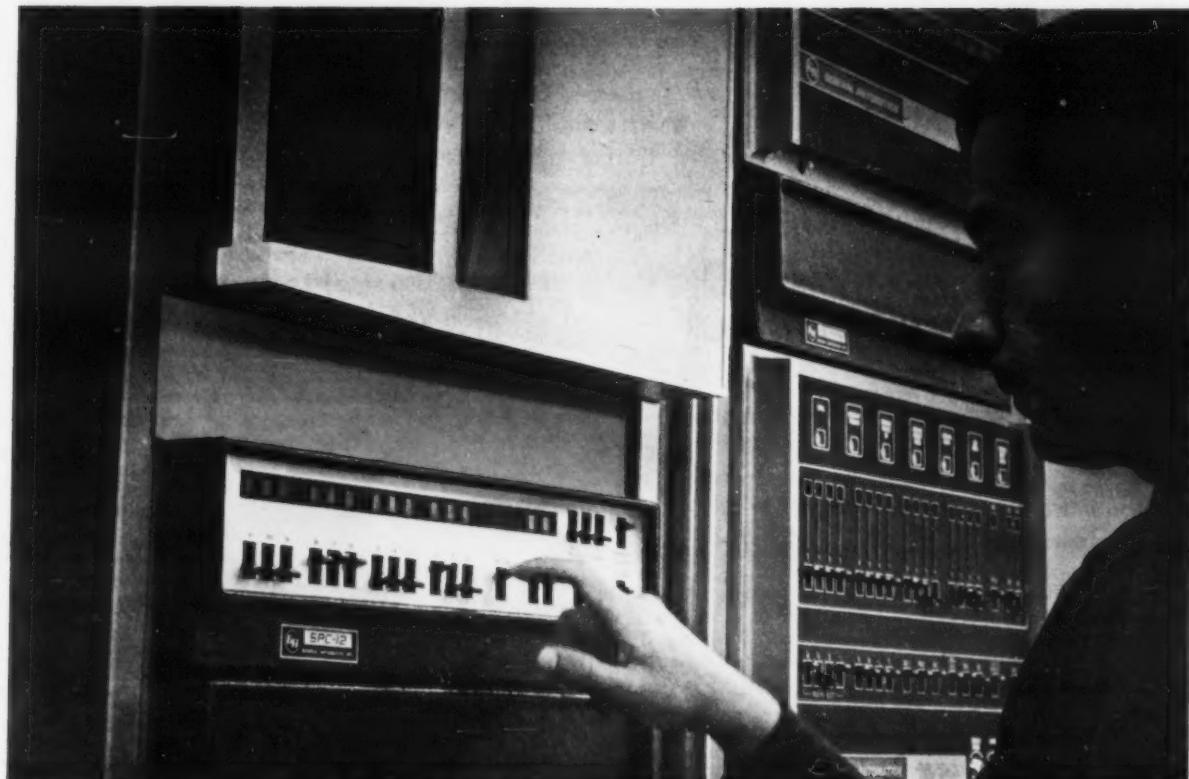
MAYNARD, Mass. — The first demonstration of its industrial data acquisition system, Indac-8, will be made by Digital Equipment Corp. at the Instrument Society of America Show, Oct. 27-30.

A typical Indac-8 system includes a DEC PDP-8/I or PDP-8/L computer with a core memory of 8,192 12-bit words; two Teletypes; disk storage facilities for up to 65,536 words; 50 contact inputs; a 100-channel analog/digital converter; and a real-time clock, said a company spokesman.

The Indac-8 exhibit will be highlighted by a real-time "weigh-in," in which a scale will be on-line to the computer system. Visitor's weights will be recorded and averages continuously calculated.

A second demonstration, run simultaneously on the same system, will show the data acquisition and control capabilities of Indac-8 via an automatic test of a motor-generator set.

Introduced this April, Indac-8 is being marketed to the chemical, petrochemical, metals, utility, aerospace, and research industries. It is designed for such functions as data logging, alarming, basic set-point control, and quality testing. First deliveries are anticipated this fall.



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ASIS Sees Marc II

WASHINGTON, D.C. — The annual meeting of the American Society for Information Science will be held in San Francisco on Oct. 1-4.

Highlights of the meeting include demonstrations of on-line terminal systems for a variety of applications, exhibitions of equipment, and tutorial and technical sessions.

Preceding the conference, Marc II, a special institute, will be presented by the information science and automation division of the American Library Association and the information systems office of the Library of Congress.

Attendees at the Marc II institute will hear from Library of Congress staff members who are daily using the Marc II magnetic tape service and also from librarians presenting their applications of Marc II records in operational situations.

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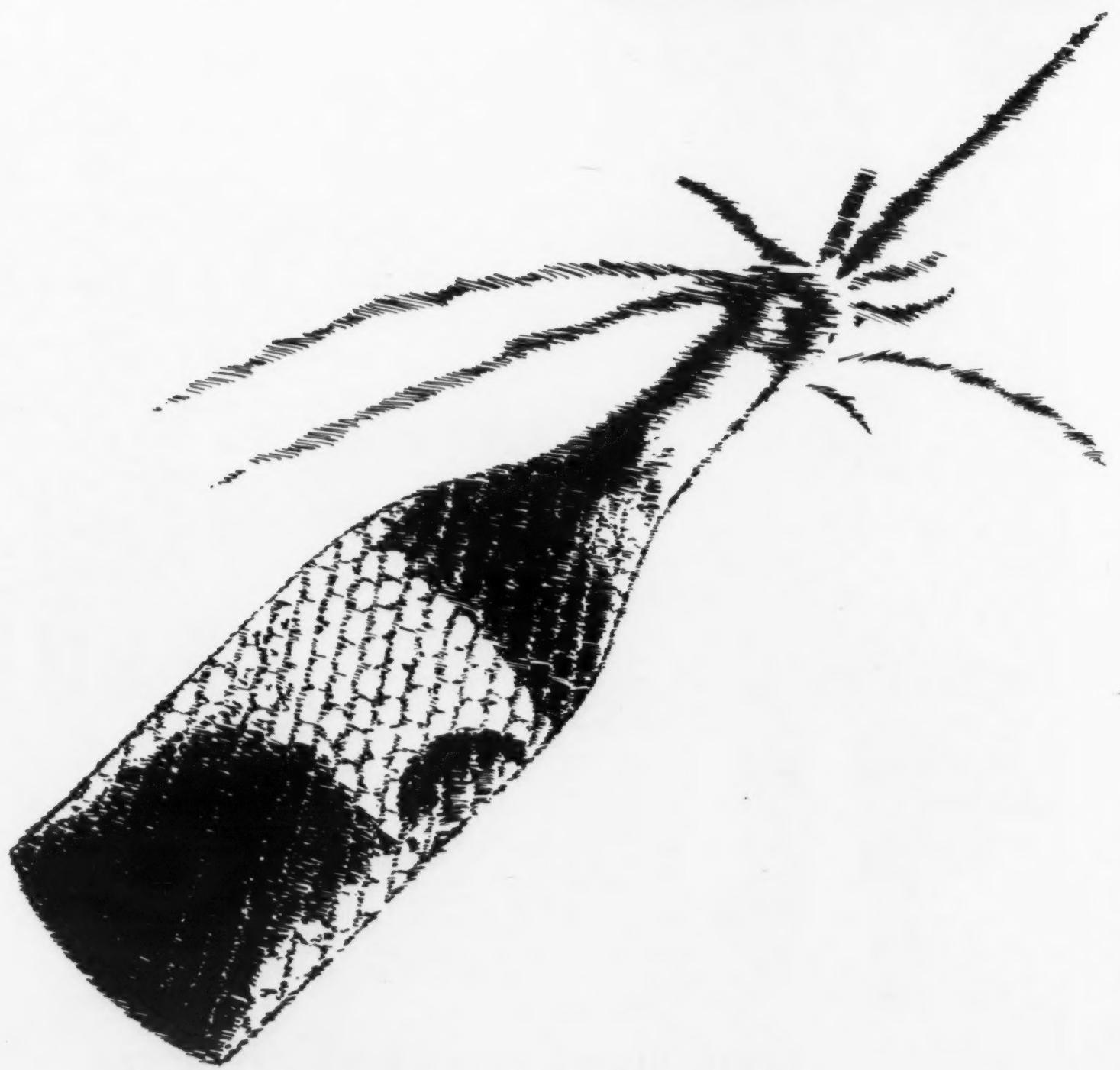
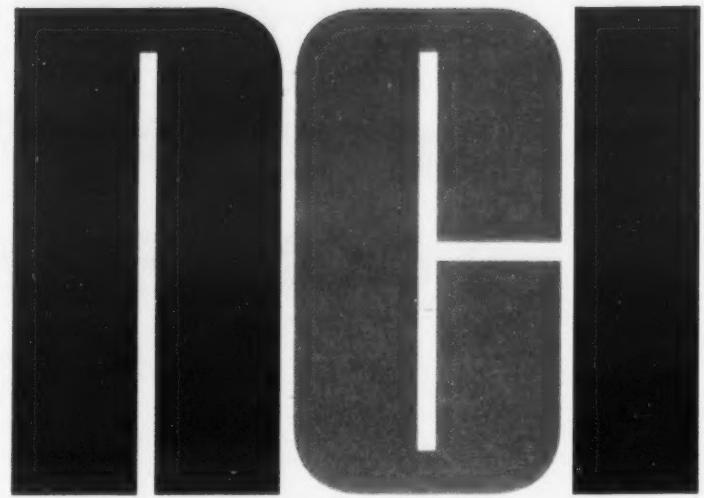
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COMPUTERWORLD

applications

Computer Collects Tolls From Passing Vehicles

By a CW Staff Writer

SAN FRANCISCO — Commuter buses will soon speed through toll booths on the Golden Gate Bridge with only a passing nod from toll collectors, thanks to a computer-controlled monitoring system.

Although this does not mean that the tolls will be abolished, it does mark the test phase of a U.S. Department of Transportation study that hopes eventually to eliminate traffic bottlenecks and driver inconveniences at toll plazas.

Called Automatic Vehicle Identification (AVI), the Golden Gate installation is built around an IBM 1800 data acquisition and control system that electronically monitors specially equipped passing vehicles.

Vehicles in the AVI test are equipped with a crystal-controlled transponder that generates a code signal at a set frequency when activated by another received radio signal.

When a test vehicle is driven up to the toll booth, the transponder detects a signal generated by a radio transmitter installed in the bridge pavement.

The detected signal activates the transponder mounted underneath the vehicle, and the identifying code signal produced by the transponder is automatically activated.

This identifying code is then received by a second antenna, which is connected to an electronic system that converts the received frequency-coded signal to IBM-compatible code for transmission through a data link to the nearby 1800 central processor.

The computer stores the received data on disk and also updates a hard-copy printout of all received vehicle codes. In addition, a paper tape record is generated for later analysis.

"This is entirely experimental," stressed Robert E. Shields, engineer of the Golden Gate Bridge and Highway District. "We're just taking the first step with this test."

"But if the results are as good as we hope they'll be, we can work toward making this system available to other commercial vehicles — eventually, perhaps, even to private cars."

The test installation was engineered by Taller & Cooper Division of Litton Industries.

In explaining the use of the system, Richard Hohmann, manager for marketing services, said that so far the transponder units have been installed only in official bridge authority vehicles.

He added that soon the test will be expanded to include 200 local commuter buses that daily travel the Golden Gate between San Francisco and Oakland.

"In addition to enabling the commuter buses to maintain their speed when passing the toll booths, the data compiled by the 1800 system will allow the transit company to adapt their scheduling to the traffic flow during rush hour periods," he said.

Hohmann added that the computer records the exact time a vehicle passes the toll booth and the date, and accumulates the tolls due based on the type of vehicle identified by the monitoring system.

Although high-volume bridge users will maintain a prepaid toll account with the bridge authority, a postpaid billing system would also be feasible for private users who crossed the bridge on a transient basis, Hohmann said.

The automatic toll collection experiment is actually only one facet of the computer's work on the bridge. The 1800 system was installed primarily to keep track of the 10 different types of fares collected and to handle payroll and other internal accounting chores.

Veterinary Data Could Benefit Humans

NEW YORK — Veterinary medical data based on the treatment of sick and injured animals is being compiled through a computer coding system designed to provide potential information exchange with institutions dealing in human medicine.

Originated by the Animal Medical Center, the system uses standard nomenclature of the International Classification of Diseases developed by the World Health Organization.

The coding system covers 19 species and over 200 breeds of animals — ranging from the Af-fenpinscher (canine) to the wallaby (marsupial).

Data on each animal's sex, age, and condition is coded into the computer on the initial visit. Standard coding forms have been designed to record results of laboratory tests.

Using the system, the center can exchange data with numerous human hospitals using the same classification. The exchange facilitates joint studies in the diagnosis and treatment of many ailments, including tumors, cataracts, and heart disease.

"All this professional activity," says Dr. Robert Tashjian, the center's director, "generates a wealth of scientific data of great potential value to administrators, researchers, specialists, and students. Computer processing is helping to organize this data and make it more accessible."

"In the future," says Tashjian, "the computer may be useful to the private practitioner. For example, we might set up a central medical record for a number of veterinarians. With typewriter

terminals in their offices, they could query the computer about a particular case or group of cases, and get back a complete medical history."

In explaining the system, Miss Judith Mapes, administrative assistant and director of the center's data processing center, said that similarities existed between human and veterinary medicine in such areas as heart defects and bone fractures.

She added that although present data comparisons are being made on a post-diagnosis basis, computer-assisted diagnosis based on inputs of symptoms is a possibility in the future.

When it's not processing medical records, the 1130 prepares staff work schedules, keeps accounting and fund raising records, and compiles the hospital's internal census.

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The system permits simulation of basic hand recording methods, follows generally accepted accounting principles and procedures, provides an effective method of error control and audit trail, and supplies formalistic presentation of data without special preprinted forms.

Modular Design

The total system is modular, and independent groups of modules may be pur-

chased to fit the users' program needs. CAS III is programmed in BAL; requires a minimum configuration of 32K bytes of core in TOS or DOS environment.

Report Flexibility

Accounting reports headings, column designations, indentation, total levels, combining, scheduling, etc. are determined by the user, through input, to allow tailored report presentation. Ledgers require no fixed chart of accounts and allow 30 characters of alphabetic account description. The ledger offers a flexible code number structure. The user may employ a one to six digit code number along with sub-account designation. Subsidiary ledgers are reached through a special four digit code number.

Audit Features

All data enters the system through a journal or register and is automatically checked for arithmetic or posting errors. Errors are flagged and presented in an error analysis

report. Each journal has a debit and credit trial balance; is posted to the general ledger, balance forward or in detail by entry, including day, reference number, journal source, alphabetic description, amount, etc. This detail allows complete historic analysis upon request. A unique year-end file allows simultaneous processing of current and past year.

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CAS III is adaptable to the needs of any size and type business: manufacturing, wholesaling, retailing, chains, franchising, banks, insurance, institutions, and services. System includes accounting Journals, General Ledger, Financial Statements, Government Reports, and financial reports needed for good management control. Program Manuals for set-up, operations and administration, including all needed forms, are furnished.

The Modules listed below may be purchased in one or more units, as needed:

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PHASE VII ACCOUNTS RECEIVABLE MODULE

- A. Statements
 - 1. Standard format
 - 2. Automatic service charge
 - 3. Alphabetic and numeric invoice description
- B. Aged Analysis
 - 1. Current 30-60-90 days aging
 - 2. Year-to-date customer activity
 - 3. Sales analysis (salesmen, territory, department, etc.)

PHASE VIII TIME ANALYSIS MODULE

- A. Productive hour evaluation.
- B. Time distribution by labor category, and individual.
- C. Extensions at assigned rates.

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Magnetic tapes from a Burroughs B5500 add bench strength to Kent State University's "Golden Flashes" football team.

Burroughs B5500 'Player' Joins Kent State's 'Golden Flashes'

KENT, Ohio — Football players and coaches at Kent State University have high hopes for their new team member, a computer that already has helped Kent triumph over opponents.

So do Kent alumni and football fans. Last year, Kent's "Golden Flashes" won only one of 10 games for the worst record in the school's history.

This fall, for the first time, the college will use its Burroughs B5500 system to determine tendencies of opponents, providing information to help them adjust defensive strategy and hopefully control opposition attacks.

Kent's freshman coach and chief engineer of the computer program is Terry Mallett.

Mallett takes the statistics of each play and feeds them to magnetic tape reels in the B5500, which digests the information

and prints out data showing tendencies of the opposing team and its individual players. With the data, Kent players can get to know their opponents man-for-man.

Statistics that go into the B5500 include the type of play, zone, yards and down, individual player, etc. Computer printouts show listings of all formations, total attempts of each, percentage used out of all formations, number of runs and passes, and types of runs and passes.

The B5500 also gives a breakdown by down and distance of each formation for both passing and running plays off that formation. And, of course, the information about a basic formation and all patterns that were run off of that formation give Kent the opposition's tendencies.

Mallett says that such information has been available in the past, but not nearly as quickly or as thoroughly as with the B5500. Reduction in time will be a big advantage to the team.

By using the B5500, the team will be able to devote more time studying the information, practically eliminating the time-consuming paper work of the past.

It is conceivable that the B5500 will be adapted for use during games. "With special equipment," says Mallett, "plays can be recorded and keypunched right on the field, fed into a card reader, and sent electronically to tape reels of the main computer on campus."

Within a few minutes after the first half, we will have all the information we now take from a film or scouting report. This will help tremendously in planning strategy for the second half."

Computer Billing Service Cuts Costs Of Freight Users

HOUSTON — A computerized payment service designed to cut billing costs of freight users has been developed by Computer Freight Systems Inc.

The system utilizes Control Data Corp. 915 page readers with a CDC 1700 computer.

Computer Freight Systems collects, audits, and handles payment of freight bills for its clients.

The nation's freight bills currently run to \$41 billion annually, a manufacturing cost that is exceeded only by the cost of labor and materials. Studies by CFS indicate that many freight users are spending from one to three dollars to clear a freight bill, while the computer system can process freight bills for as little as 20 cents per bill.

All incoming freight bills are typed on special forms and then scanned by the 915 page reader at the rate of 370 char/sec. The scanned information goes directly to the CDC 1700 computer system where it is edited, formatted, and recorded on magnetic tape.

The taped information is next entered into the computer for final processing, which produces a payment check.

At the conclusion of each working day the system prepares a daily statement for each client. The statement contains the name of the carrier, freight bill number, date, shipper or consignee, whether the shipment was inbound or outbound, amount billed, and the total amount of the client's bill.

Benefits of the computer freight's payment plan to clients include: elimination of voucher preparation; preparation of a single check for each carrier payment; and a reduction in accounting, mailing, handling, and overhead cost. The daily statement provides clients with a quick overview of all freight charges and permits better auditing and control.

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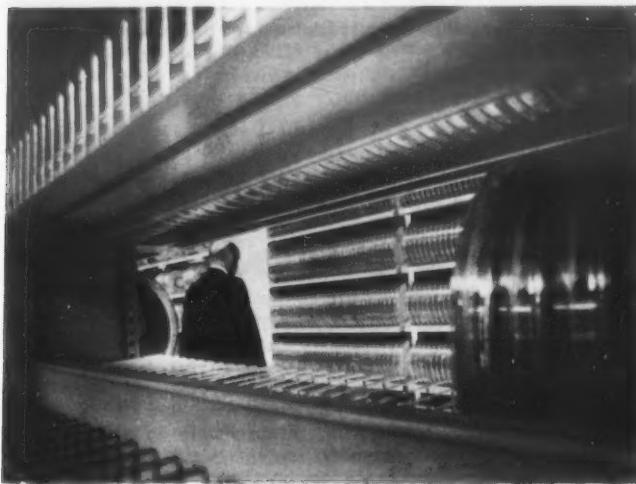
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October 1, 1969

Page 25



Billions of pieces of brokerage information are filed on the magnetic computer tapes shown in the RCA systems center library in New York.

Exchange Report--Part I

Overhaul Blueprint Sees More Computer Application

NEW YORK — The American Stock Exchange has released a broad-based blueprint, prepared by North American Rockwell Corp., recommending a nationwide overhauling of the financial community's operational procedures.

The study proposes a series of major steps, many of them involving the use of advanced data processing technology, to provide timely solutions for a wide range of problems ranging from the origin of the investor's order to the final settlement of the trade.

Initiated in February, the six-month study was authorized by the Amex board of governors to augment the financial community's efforts to solve its operational problems.

The program provides five principal recommendations that North American Rockwell believes would:

- Reduce errors at the source of a transaction by on-line computer-editing of orders and a monitoring system to speed trades to market. New man/machine-readable order tickets would be printed out on the floor for broker action at the marketplace.

- Centralize an automated clearance of securities in a new national clearing service to be linked by computer to regional clearing centers in major market areas.

- Develop a locked-in trade procedure to capture, at the point of trade, all data necessary to report transactions simultaneously to the ticker network, originating broker offices, clearing, and surveillance functions.

- Eliminate the flow of securities through most of the system by placing them in transfer agent depositories electronically tied to the clearing service.

- Overcome transfer and registrar delays by establishing standardized, high-speed, and consolidated transfer-registrar facilities using man/machine-readable stock certificates, attachments, and instructions.

Ralph S. Saul, president of

Amex, stated, "The paper work logjam in the securities industry has pointed up the industry's need to take advantage of technological advances.

"Although full agreement cannot be expected on all of the recommendations, the report should receive careful study and serious evaluation by the entire financial community," he said.

On-Line Edit of Orders

The report estimates that brokerage houses are spending about \$2-\$3 million per week to rectify trades and other large sums to seek and to correct errors on a variety of records and reports.

It was recommended that an order input device, integrated with a computerized edit of all trades entering the system, could materially reduce the number of errors now being made in the order entry process.

The registered representative or his sales assistant would enter a customer's order into the system by electronic keyboard. A CRT unit would display order data for instant check at the source. A computer would edit data upon entry and either reject a "bad" order, indicating why it was unacceptable, or route a "good" order to the proper market.

The computer-edit would determine if the proper elements such as a valid ticker symbol or a specified limit price were specified.

The entire order transmission process would be under automated scrutiny to make certain all trades were delivered to the market, executed, and confirmed.

Additionally, a firm's output device on the floor of an exchange would produce a man/machine-readable order ticket for broker action and for ease of processing the completed trade.

National Clearing Service

The report states, "Development of a nationwide system of clearing and settlement, integrated with transfer agent deposi-

(Continued on Page 33)

Mohawk's Earnings Climb 119%, Revenue Goal Short \$2 Million

NEW YORK — Mohawk Data Sciences Corp. has announced that earnings of the data processing manufacturing and marketing concern in the fiscal year ended July 31, 1969, rose 119% to \$6,650,000, equal to \$1.22 per share of common stock after utilization of tax loss carry-forwards amounting to 7 cents a share.

Earnings in the prior fiscal year were \$3,050,535 or 58 cents per share, which included a 19 cent per share benefit from tax loss carry-forwards.

Both per-share figures are based on the average shares outstanding during the respective fiscal years.

Fiscal 1969 results are subject to completion of year-end audit.

Total revenues in fiscal 1969 amounted to \$83 million, including rental and service income of \$22 million.

In the prior year, revenues were \$53,845,000, of which \$9,381,985 came from rentals and service.

V.E. Johnson, chairman and president of Mohawk, said, "Our operating earnings fell short of our originally budgeted revenues and profit goals of \$85 million and \$1.35 per share principally because of a shift in the sales-to-lease ratio in the last three months of the year, especially in our expanding foreign operations.

"The expected level of sales to end-users failed to materialize in the fourth quarter."

"Tightening monetary conditions in the U.S., Europe, and Canada not only increased our interest expense, but also apparently induced an unexpectedly large number of customers, especially in Europe, to rent rather than buy our equipment.

"Since outright sales to end-users are the most profitable we have, the shift of even a portion of these to rental income defers profits to future periods at the expense of current results."

"The record sales and earnings performance this year, coupled

Commenting on the outlook for fiscal 1970, Johnson stated that, "Mohawk Data's business continues strong, as evidenced by worldwide orders, production, and deliveries. It seems unlikely, however," he said, "that interest rates here or abroad will diminish notably over the near term.

"We would expect, therefore, that our rental population, especially in Europe, may increase even more rapidly.

"To the extent that such increased rentals are not matched by an increase in sales to other customers, operating earnings in fiscal 1970 may not advance as sharply as otherwise might have been anticipated."

Johnson also noted that the company was contemplating a change in the accounting treatment of engineering and development costs in the 1970 fiscal year.

"We may be at the point," he said, "where we can no longer enjoy the luxury of writing off all engineering and development costs as incurred."

"MDS engineering today is less concerned with product additions and modifications with a relatively short-term payback than with innovative development projects with a two- to five-year time horizon.

"Accordingly, the costs of such projects may be capitalized in the future, as is the case with many large companies in our industry today. In terms of magnitude," Johnson concluded, "approximately \$2 million of last year's \$5-million write-off for engineering and development costs would have qualified for such treatment had the policy been in effect for fiscal 1969."

Potter Instruments Posts Record Sales and Revenues

PLAINVIEW, N.Y. — Potter Instrument Co., Inc. has reported all-time record sales and earnings for the fiscal year ended June 28, 1969.

Net sales totaled \$31,006,083, an increase of 52% from the previous record of \$20,401,246 set a year ago.

Net income from operations rose to a record \$1,885,850, equal to 77 cents a common share, an increase of 64% from the \$1,149,495, or 48 cents a share, in fiscal 1968.

Total net income amounted to \$2,192,175, or 89 cents per share, including extraordinary items, resulting in a net gain of \$306,325, equal to 12 cents per share.

"The record sales and earnings performance this year, coupled

with an approximate 50% increase in the company's backlog over last year's all-time record, indicate the accelerating demand for Potter products in all product areas and provide a solid basis for future growth," President John Potter said.

The company stated that the previously reported, non-recurring gain obtained from the sale of an investment has been partially offset by a provision for losses on a discontinued product line.

Sales for the fourth quarter were a record \$9,887,865, up 55% from the \$6,387,835 in the same three months of 1968. Net income from operations was \$703,143, or 29 cents per share, compared with \$204,247, or 9 cents per share, for the corresponding 1968 quarter.

Computer Short Interest Continues Up

By a CW Staff Writer

NEW YORK — Computer short interest on both the New York and American stock exchanges continued to increase for the second consecutive month during the month ended September 15.

Across-the-board short interest on the NYSE continued the upturn started last month, and the American exchange reported the first increase in short interest since March.

Short interest on selected computer stocks on the NYSE increased 136,260 shares to 1,826,143 from 1,689,883.

On the American the increase was 55,232 shares to 574,378 from 519,146.

With short selling, borrowed stock is sold.

The seller generally anticipates a price drop that will enable

him to repurchase an equal number of shares at a lower price.

The short interest is the number of shares not repurchased for return to lenders and represents, in effect, a definite backlog of potential buy orders.

The following tables show the New York and American computer stocks in which a short position of at least 20,000 shares existed on Sept. 15, or in which there was a short position change of at least 10,000 shares since July 15.

NYSE SHORT INTEREST

Amer Photocopy	53,675	61,375
Equip		
& Dev	73,143	21,812
Burroughs Corp	107,100	100,183
Collins Radio Co	40,585	39,205

Computer Sciences	109,657	96,563
Control Data Corp	164,747	193,638
General Electric	61,047	37,023
Inter Business Mach	59,253	55,462
Leasco Data Proc Equ	127,858	148,339
Leasco Data \$2.20 cv pr	33,000	37,400
Memorex Corp	37,615	47,830
Nat Cash Register	66,708	78,172
RCA Corp	30,254	32,296
Sanders Associates	32,122	21,897
Scientific Resources	30,653	27,854
Sperry Rand Corp	235,212	119,672
Varian Assoc	33,626	32,531
West Union Tel	20,011	38,975
Xerox Corp	509,877	499,665

AMERICAN SHORT INTEREST

Astrodata Inc	51,855	67,060
Data Process		
Fin Gen	89,779	59,055
Data Prod Corp	45,947	47,662
Digital Equip Corp	62,857	56,719
Leasco Data wts 78	42,355	17,517
Levin-Town Computer	69,584	77,560
Mite Corp	16,200	4,100
Mohawk Data Sciences	53,346	58,187
Plan Research Corp	82,264	77,224
Potter Instrument	22,300	11,200
Telex Corp	37,891	42,862

Orders and Installations

Pan American World Airways has ordered a 747 flight simulator from The Singer Co.'s Link Division for installation at its West Coast training center. The simulator will be used in conjunction with 33 of the 747 aircraft purchased by Pan Am and scheduled for service before the end of this year.

The Provident Clothing & Supply Co. Ltd., a British check trading company, has ordered an International Computer Limited 1906F in order to extend computer control over its documentary system.

Suffolk County, New York, has placed an order for two Univac 418-111 computer systems to increase the efficiency of its law enforcement, social welfare, and other county agencies.

Comcet, the St. Paul, Minnesota-based communications computer manufacturer, has shipped its first Comcet 60 system to Computer Network Corp. of Washington, D.C. The order calls for four additional systems, including read/punch units, printers, magnetic tape units, and disk files, for a total value of \$1,508,000.

An SDS Sigma 5 system has been ordered by Newport News Shipbuilding and Dry Dock Co. It will aid in a unique experiment that will attempt to get a 100,000-ton tanker through the polar icecap and establish a Northwest passage for transporting Alaskan oil to East Coast refineries.

Armstrong Cork Co. Ltd., manufacturer of smooth-surface flooring, has ordered an International Computers Limited 1902A for delivery to its North London offices for accounting and production control. Also included in the order are five ICL magnetic tape encoders.

Beamtenheimstaettenwerk GmbH., a building and loan association for employees of the West German government, has purchased a \$1.8-million Univac 494 real-time system for installation at its headquarters near Hannover. The system's primary function will be the administration of various projects under the organization's authority.

A large-scale GE-635 system has been ordered by the research and development agency of France's post and telecommunications ministry. Known as Centre National D'Etudes des Telecommunications, it is responsible for research and development work for the French nationalized postal, telephone, and telegraph system.

Bothe Computer Corp. has signed a long-term, \$3.5-million lease contract with Combustion Engineering, Inc. for a CDC 6600. Its function will be research and development of nuclear steam supply systems, components, and fuels, and design and engineering of chemical process plants and petroleum refineries.

Brunei Shell Petroleum Co. Ltd. has ordered enhancements for its ICL 1900 series data processing unit situated at its oil fields at Seria in the jungle of Borneo. The additions upgrade the existing 1901 installation to a 1902A system. In addition to general commercial applications, the system is performing many technical functions involved in the search for oil on land and off-shore.

The French Weather Bureau in Paris is building a computer complex that will forecast weather conditions accurately and will provide data on meteorological research. The heart of the complex will be a CDC 6400 system that will supplement their existing 6400 and the 250 data entry/display unit.

A computer-based communications controller designed to replace slower electro-mechanical equipment has been delivered

to the U.S. Defense Communications Agency by Digital Equipment Corp. This "turnkey" system uses a refurbished PDP-8 computer, a 65,536-character disk storage unit, an interface to a large central computer, and a special software package.

The Ndola City Council in Zambia has ordered an ICL 1901A computer. It will be used during working hours by the city for billing, notices, rent collection, and the electoral roll, and during the remaining hours by International Computers (Zambia) Ltd.

The Silver Burdett Co., a division of General Learning Corp. and a supplier of textbooks, has ordered a General Electric GE-415 information system to handle inventory and to process orders.

An SDS Sigma 5 system has been

ordered by Sangamo Electric Co., Springfield, Ill., for use in its general engineering development effort that includes both mechanical and logic design.

Consolidated Computer Services Limited of Toronto has sold three time-shared computer systems in the U.S. The orders have a total value of over \$500,000. The first was installed at the Fairchild Research and Development Laboratories in Palo Alto, Calif.; the second was installed at Computer Solutions Inc. in East Orange, N.J.; and the third will be installed at the Frankel Engineering Laboratory in Reading, Pa. The first major Canadian installation will be made this month.

The William J. Burns International Detective Agency, Washington, D.C., has ordered a Delta Data Systems general

ledger package for processing the data of its home office and its detective, guard, and patrol divisions.

A Control Data page reader system, consisting of a 915 page reader and an 8092-B computer, has been installed at the U.S. Army Equipment Command, St. Louis, Mo., to provide inventory control for a wide range of Army material. The 915 reads typewritten documents at the rate of 370 char/sec.

National Taiwan University, Taipei, Taiwan, has purchased a 3150 system from Control Data Corp. for its graduate school of engineering. The CDC system is for use in research in the physical sciences, student instruction in the computer sciences, and university administrative data processing.

If she types, she's already trained to use a **COMPATTM** **88-23** **Data Terminal**



Nasa Accepts \$12 Million Univac System

ST. PAUL, Minn.—Performance demands have been met by the \$12-million Univac 1108 multiprocessor computer system recently accepted by Nasa at its Marshall Space Flight Center at Huntsville, Ala., following 35 days of around-the-clock operational testing.

The "3 by 2" (three processors and two input/output controllers) multiprocessor system met the rugged acceptance criteria with an average performance of 97.3%, Univac officials said.

The contract called for hardware reliability of 95%, compared to the normal 90%, indicating "the stringent specifications under which the system was installed," they added.

While consisting mainly of off-the-shelf hardware items, the extreme complexity of the MSFC's

new and fully integrated, all-purpose, in-house computing system is measured by its unparalleled mix of input/output stations, which are required to perform a wide variety of applications, according to Univac.

One or more terminals are located in each major laboratory and many of the management offices at the center. They range in complexity from Teletype stations to extensive graphics terminals and entire checkout stations.

The basic graphics stations use Uniscope 300 visual communication terminals. The advanced stations use Univac 1557-1558 graphic display subsystems.

The Univac Exec 8 operating system was enhanced to include programming features unique to the MSFC application, according to Univac.

Exec 8 shares 262,000 words of core memory with the three 1108 central processors and the two input/output controllers in a multiprocessor mode.

On-line input/output is provided by three Univac high-speed readers with 900 card/min capacity, two Univac card punches, seven Univac high-speed printers with 1,600 line/min capacity, and 26 Uniservo VIIIC magnetic tape units.

For 35 days, performance was measured on a three-shift, seven-day schedule that accrued 555 hours of operational use time and only 15 hours of remedial maintenance.

The workload consisted of normal MSFC production activity, continued applications conversion, application development, and successful real-time support of the Apollo 10 lunar mission.

Earnings Reports

ADVANCED COMPUTER TECHNIQUES

Year Ended March 31

	1969	1968
Shr Ernd	\$15	\$19
Revenue	2,475,068	2,058,129
Earnings	96,089	102,313

AMPEX CORP.

3 Months Ended Aug. 2

	1969	1968
Shr Ernd	\$29	\$26
Revenue	68,558,000	58,976,000
Earnings	3,093,000	2,485,000

ADDRESSOGRAPH-MULTIGRAPH

Year Ended July 31

	1969	1968
aShr Ernd	\$3.31	\$3.09
Revenue	416,125,000	378,747,000
Spec Chg	b795,000	
Earnings	26,596,000	c23,992,000

a—Based on income before charge;

b—Devaluation loss; c—Equal to

\$2.99 a share.

HEWLETT-PACKARD CO.

3 Months Ended July 31

	1969	1968
Shr Ernd	\$48	\$45
Revenue	82,727,000	68,601,000
Earnings	6,126,000	5,626,000
9 Months		
Shr Ernd	1.41	1.16
Revenue	234,686,000	196,114,000
Earnings	17,814,000	14,529,000

AUTOMATIC DATA PROCESSING

Year Ended June 30

	1969	a1968
Shr Ernd	\$1.45	\$1.13
Revenue	26,703,503	20,480,646
Earnings	2,326,972	1,794,045
a—Restated to include companies acquired in pooling-of-interests transaction.		

MANAGEMENT ASSISTANCE INC.

3 Months Ended June 30

	1969	1968
Revenue	\$17,623,372	\$17,133,859
Loss	641,751	812,352
9 Mo Rev	54,006,162	49,489,652
Spec Chg	a17,000,000	
Loss	1,153,574	19,834,281
a—Primarily a provision, equivalent to the book value of certain types of data processing equipment, off rent, and in excess of MAI's estimated current requirements.		
The company notes that results of operations for the '68 and '69 fiscal periods aren't directly comparable because of variations in the amortization of certain expenses and the provision for deferred taxes.		

SYSTEMS CAPITAL CORP.

6 Months Ended June 30

	1969	a1968
Shr Ernd	\$13	
Earnings	485,218	

a—Comparative figures unavailable; company went public in March, 1968.

WALLACE BUSINESS FORMS

Year Ended July 31

	1969	1968
Shr Ernd	\$2.11	\$1.84
Revenue	29,339,000	26,032,000
Earnings	1,865,000	1,625,000

WYLE LABORATORIES INC.

3 Months Ended July 31

	1969	a1968
bShr Ernd	\$16	c\$.16
Revenue	26,917,464	13,996,770
Earnings	564,041	508,935
b6 Months		
Shr Ernd	.23	c.34
Revenue	51,692,260	28,059,408
Earnings	814,254	1,104,412

a—Restated to reflect acquisitions on a pooling-of-interests basis; b—After giving full effect to potential dilution resulting from conversion of the company's preference stock and stock options; c—Adjusted for 2-for-1 stock split in March, 1969.

ROBINS INDUSTRIES CORP.

3 Months Ended June 30

	1969	1968
Shr Ernd	\$.08	\$.07
Shr Ernd	656,100	628,900
Revenue	32,100	30,300
6 Months		
Shr Ernd	.15	.17
Revenue	1,277,063	1,297,910
Earnings	58,844	66,980

COMPUTER INSTRUMENT

28 Weeks Ended July 11

	1969	1968
Shr Ernd	\$3,914,973	4,287,423
Earnings	(195,061)	144,630

BOLT BERANEK & NEWMAN

Year Ended June 30

	a1969	1968
Shr Ernd	b\$.32	\$.25
Revenue	15,173,200	10,888,600
Spec Cred	c299,100	
Earnings	d675,900	281,500

a—Includes 6 month operations of the Wood Flong Corp. and Mormac-BBN, acquired Jan. 1, 1969; b—Based on income before special credit; c—From sale of foreign time sharing computer activities; d—Equal to 57 cents a share.

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Revenues Increase 270% For Data Automation Co.

DALLAS — Data Automation Co., Inc., a Dallas-based company serving the data communications industry, has reported revenues totaling \$3,264,647 for the six-month period ending July 31.

The revenues represent a 270% increase from \$1,209,992 in revenues for the same period of the previous year.

Net earnings of \$290,168 are a 250% increase over the corresponding time period of 1968.

Pretax profits, before extraordinary items, totaled \$361,076, a five-fold increase from 1968.

Net income per share was 22 cents, a 144% increase of per share income.

DAC has focused its development on the data communica-

tions market during the past six months. The company says it now ranks as the largest unregulated nationwide firm providing third party leasing and field maintenance of time-sharing computer terminals. DAC operates service centers in 18 major cities.

DAC subsidiaries contributing to the company's growth include Data Automation Communications, providing service and maintenance for the terminals; Data Automation Services, specializing in data processing equipment sales, leasing and service; and Flight Plan, Inc., a recently developed program scheduled to offer flight planning information to general aviation through a nationwide network.

A 100% stock dividend has been voted by the board of directors of Redcor Corp.

Subject to stockholder approval of an increase in the number of authorized shares for the corporation, to be voted on at the annual shareholders meeting, the stock dividend will be issued on Dec. 1 to those shareholders as of record Oct. 23.

Databab, Inc., a computer service company with data centers in New York, Chicago, and Los Angeles, said its board of directors has approved a proposal to purchase the company's own stock from time to time for the Databab treasury.

Databab Chairman and Chief Executive Alvin L. Steinhart, in making the announcement, put a book value of about \$6.50 per

share on the company's stock, based on 591,515 shares outstanding, and stated that in the present market, Databab had been selling below this level.

Guidance Technology, Inc., Santa Monica, Calif., producer of aircraft instrumentation and data processing systems and services, on Sept. 15, 1969, listed 2,521,470 shares of common stock for trading on the Pacific Coast Stock Exchange. The company's ticker symbol is GTE.

The information systems division, established in August, 1968 with the installation of a Univac 9300 computer, provides systems planning, analysis, programming, and data processing for GTI and operates as a computer service bureau for commercial customers, the company said.

Intertech Research Services, Inc., New York, has been listed

on the National Stock Exchange. The stock was assigned the ticker symbol ITH.

Intertech listed 526,272 of common stock. The company's shares were previously traded over-the-counter.

Intertech is engaged in a wide range of computer-related consulting, software, and data processing services. The company also markets a proprietary, computerized stock-transfer system and punch card stock certificates through its wholly owned subsidiary, Transtech.

Directors of Vermont Research Corp. have declared a dividend of 20 cents per share, payable on shares of record Sept. 11.

The officers anticipate reporting earnings for this fiscal year ending Sept. 30 substantially higher than a year ago, on sales in excess of \$3.5 million.

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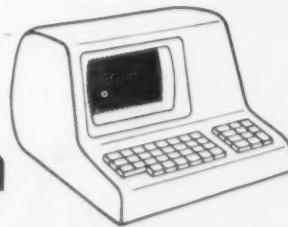
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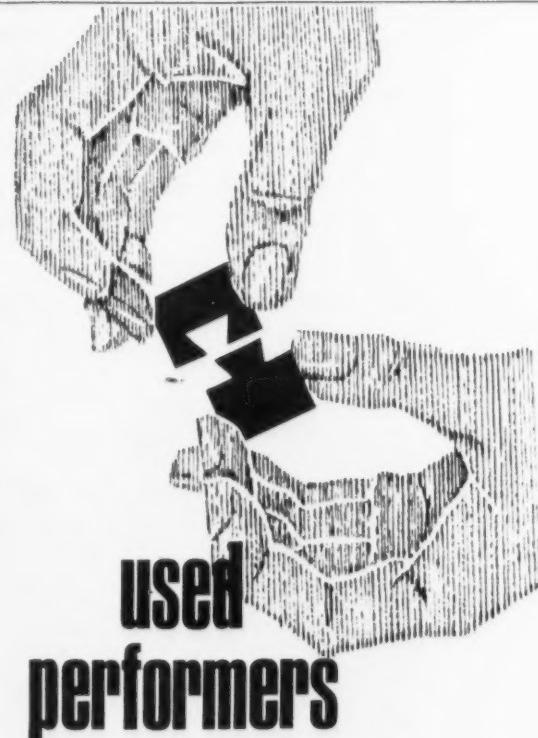


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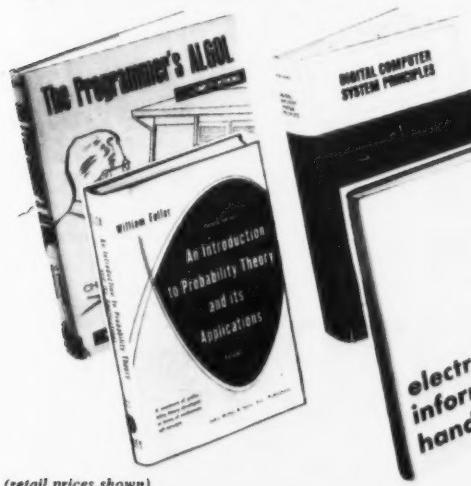
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New Registrations

COMPUTER BUSINESS SYSTEMS INTERNATIONAL, INC., 15 W. 34th St., New York, N.Y., a company engaged in computerized programs for the collection of delinquent accounts receivable, filed to register \$400,000 of convertible subordinated debentures, 100,000 shares of common stock, and 20,000 common stock purchase warrants. Proceeds intended for leasing a digital computer and peripheral equipment, and for development, advertising, and marketing expenses. The underwriter is Charter Securities Co. Ltd., 55 Liberty St., New York, N.Y.

COPY-DATA SYSTEMS, INC., 12-20 River Road, Fair Lawn, N.J., a company engaged in the sale, distribution, and servicing of electrostatic copy equipment and supplies, has filed to register 200,000 shares of common stock. Proceeds, at \$3 per share, intended to retire indebtedness and to finance the development of a New York City office for New York Systems of Copy-Data, Inc., a subsidiary. The underwriter is Charles Plohn & Co., 200 Park Ave., New York, N.Y.

INTERNATIONAL CONTROLS CORP., 200 Fairfield Road, Fairfield, N.J. 07006, has filed to register 1,793,253 shares of common stock. The underwriter is unlisted.

DIGITAL EQUIPMENT CORP., 146 Main St., Maynard, Mass. 01754, a company engaged in the design, manufacture, sale, and service of electronic products and equipment, including digital computers, has filed to register 200,000 shares of common stock. Proceeds, at \$61.87 per share maximum, intended to repay bank notes, to finance receivables and inventories, and to finance plant facilities and equipment. The underwriter is Lehman Brothers, 1 William St., New York, N.Y.

ELECTRONIC DATA SYSTEMS CORP., 1300 EDS Center, Exchange Park, Dallas, Texas 75235, a company engaged in designing business information systems for corporate customers and in installing and operating such systems, filed to register 150,000 outstanding shares of common stock. Proceeds are \$68.50 per share maximum. The underwriter is Brokaw, Schaeffer, Clancy & Co.

COMPUTER SCIENCES CORP., 1901 Avenue of the Stars, Century City, Los Angeles, Calif. 90067, a company that provides a wide range of services utilizing its capabilities in the analysis, design, and implementation of computer and communications systems, filed to register \$50,000,000 of convertible subordinated debentures to be offered for public sale. Proceeds intended for repaying short-term bank indebtedness and for addition to the company's general funds. The underwriter is Goldman, Sachs & Co., 55 Broad St., New York, N.Y. 10004.

ON-LINE DECISIONS, INC., 2055 Center St., Berkeley, Calif. 94704, a company engaged in renting its financial analysis and planning system, filed to register 250,000 shares of common stock for public sale. Proceeds, at \$6 per share maximum, intended for two new offices and a staff to expand operations of a management institute. The underwriter is Hoppin Bros. & Co., 55 Broad St., New York, N.Y. 10004.

DATATRON PROCESSING INC., 58-51 Maspeth Ave., Flushing, N.Y. 11378, a computer service organization specializing in systems design and computer programming, filed to register 5,358,467 shares of common stock. The underwriter is unknown.

INDUSTRIAL MICRONICS, INC., RD 2, Box 120 Leesburg, Va., a company engaged in the research, development, building, and marketing of products in the electronic computer memory field, filed to register 300,000 shares of common stock. Proceeds, at \$3 per share, intended to retire indebtedness, to equip and operate a research and development facility, and to set up equipment for a core stringing facility. The underwriter is Kleiner, Bell & Co., Inc., 9755 Wilshire Blvd., Beverly Hills, Calif.

OPTIMUM COMPUTER SYSTEMS, INC., 120 W. 31st St., New York, N.Y. 10001, a company that provides systems, systems analysis and design, and computer programming and related personnel training services, filed to register 100,000 shares of common stock. Proceeds, at \$9 per share, intended to repay a note; to establish and staff a new office in Philadelphia; to establish, staff, equip, and operate two training schools; to establish a data processing service center in New York City; and to lease a third-generation computer and peripheral equipment. The underwriter is Orvis Brothers & Co., 30 Broad St., New York, N.Y. 10004.

GRAPHICOMP, INC., 342 W. 40th St., New York, N.Y., a company engaged in the utilization of computers for setting type, filed to register 200,000 shares of common stock. Proceeds, at \$5 per share maximum, intended to expand administrative and marketing staffs, and to rent 20 IBM MT/ST input keyboards over a two-year period. No underwriter is listed.

MAINSTREAM COMPUTING INTERNATIONAL, INC., 1100 Wilson Blvd., Arlington, Va. 22209, a company that designs, implements, and operates EDP systems and provides professional services in software, filed to register 300,000 shares of common stock and 300,000 common stock purchase warrants. Proceeds, at \$3 per unit, intended for repaying short-term notes, for financing promotional activities, and for general corporate and working capital purposes. The underwriter is Charles Plohn & Co., 200 Park Avenue, New York, N.Y.

SPACE SYSTEMS LABORATORY, INC., 1111 Sheridan Road, Melbourne, Fla. 32901, a company that produces hardware items of an optional nature pursuant to prime contracts with the U.S. Government and subcontracts with prime contractors, filed to register 150,000 shares of common stock. Proceeds, at \$10 per share, intended for payment of debts and accrued taxes and for general corporate purposes. The underwriter is Benjamin Werner Co., 19 Record St., New York, N.Y.

COMPUTER ENTRY SYSTEMS CORP., 12050 Tech Road, Silver Spring, Md. 20904, a company that conceives, designs, manufactures, and markets computer peripheral equipment, filed to register 250,000 shares of common stock. Proceeds, at \$10 per share, intended to establish a leasing program, to purchase component parts of the computer systems, and to assemble and manufacture the company's products.

PHASE SIX DATA CENTERS, INC., 1776 Broadway, New York, N.Y. 10019, a company engaged in providing computer programming, data processing, and related services, filed to register 150,000 shares of common stock. Proceeds, at \$2.30 per share, intended for various corporate purposes, including working capital. No underwriting is involved.

COMPUTER DATABANKS, INC., 1155 Whitney Ave., New Haven, Conn., a company that develops, acquires, and operates commercial data processing service centers, filed to register \$250,000 of subordinated convertible debentures, due 1989, and 40,000 shares of common stock.

Proceeds, at \$2.50 per share and 100% of principal amount of the debentures, intended for installation, programming, and conversion to a Burroughs B2500 computer, for implementation of its electronic data processing school, for research and development, and for working capital. The underwriter is A.D. Gilhart & Co., Inc., 295 Madison Ave., New York, N.Y. 10017.

SYSTEMS ENVIRONMENT CENTERS, INC., 200 Terminal Bldg., 65 Broad St., Rochester, N.Y. 14614, a company that intends to engage in the establishment of data processing educational centers and the development of software, filed to register 145,000 shares of common stock and 145,000 common stock purchase warrants.

Proceeds, at \$6.25 per unit (each unit consisting of one warrant and one share), intended for preparation of courses, for advertising and marketing, for equipment for three centers, and for operating expenses. No underwriter is involved.

COMPUTER SOFTWARE SYSTEMS, INC., 460 Summer St., Stamford, Conn. 16901, a company engaged in providing time-sharing services, filed to register 250,000 shares of common stock. Proceeds, at \$14 per share maximum, intended to find and develop new locations for time-sharing computers, to rent additional space, to absorb initial operating losses of additional facilities, to increase the working capital, and to be used for general corporate purposes. The underwriter is Newburger, Loeb & Co., 5 Hanover Square, New York, N.Y. 10004.

INSTITUTE FOR COMPUTER ASSISTED INSTRUCTION, INC., 42 E. Court St., Doylestown, Pa. 18901, a company that provides education regarding computer-assisted instruction to various institutions and companies that furnish computer-assisted instruction equipment, filed to register 200,000 shares of common stock. Proceeds, at \$10 per share, intended to pay for the stock of Sierra Colleges, Inc.; to pay for additional personnel, rent, and operating expenses at Sierra; to franchise more centers; to finance proposed expansion of the present business; and to provide additional services for educational institutions. The underwriter is Lomasney & Co., 67 Broadway, New York, N.Y. 10004.

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Contracts

Hybrid Systems, Inc., Houston, a subsidiary of Scientific Resources Corp. of Philadelphia, was awarded a contract by the Bendix Corp.'s energy controls division, South Bend, Ind., for its conversion and control interface to link a digital and analog computer. Bendix is also using the hybrid system for engineering/scientific studies, such as jet engine control and aircraft brake and landing-gear dynamics, and data acquisition.

Scientific Control Corp., Dallas, has received an order valued at \$1 million from Intranet Industries, Inc., El Segundo, Calif., for 50 high-speed communications terminals for use with its proprietary computer time-sharing system.

The Department of the Navy has awarded contracts to Gap Instrument Corp., Westbury, N.Y., for the manufacture of attack consoles and stabilization computers. The transaction involves over \$3,100,000, exclusive of substantial amounts to be added at a later date for maintenance spares and possible later increases at the Navy's option.

Applied Dynamics, Ann Arbor, Mich., has received an order of more than \$739,000 from McDonnell Douglas Astronautics Co., Santa Monica, Calif., for the manufacture and installation of a large-scale analog/hybrid computing system. This is the third major analog/hybrid contract Applied Dynamics has received from McDonnell Douglas.

A follow-on contract valued at \$830,000 has been awarded to Computer Sciences Corp., Los Angeles, from the Naval Electronics Laboratory Center, San Diego, Calif., for assistance in its research and development activities for large-scale tactical and strategic data systems.

Sanders Associates, Inc., Nashua, N.H., has received a contract of over \$30 million from Lockheed-California Co. for design and development of acoustic data processors for the U.S. Navy's new S-3A, a carrier-based, antisubmarine warfare aircraft. Sanders expects this contract to be followed by an award of an additional \$100 million in production contracts over the next five years.

Acquisitions

Computer Management and Research Corp., Dallas, Texas has completed the acquisition of Computer Security Corp. of Dallas. CMR is a business management and computer processing firm.

General Research Corp., Santa Barbara, Calif., which provides systems analysis, system engineering, and material analysis for government and industry, has acquired Flow Laboratories, Inc. of Rockville, Md., a company engaged in cancer research, production and sales of tissue culture, and sales of laboratory animals. The acquisition was consummated by the issuance of 270,000 shares of common stock for all the outstanding common stock of Flow Laboratories.

Computer Management and Research Corp. of Dallas has acquired all of the assets of Machine Accountants, Inc. of Waco, Texas, a computerized accounting service that will operate as a wholly owned division of CMR under the name of Computer Management Services.

The boards of directors have agreed in principle to the acquisition by Orbano, Inc., a Portland holding company, of the outstanding shares of American Data Services, Inc. in exchange for an undisclosed number of shares of Orbano. The transaction is subject to the acceptance of ADS stockholders.

The managements of Consolidated Analysis Centers, Inc. and Technology Service Corp. have terminated merger negotiations. Both companies are based in Santa Monica, Calif., and are engaged in the application of computer analysis and software techniques for government and industry.

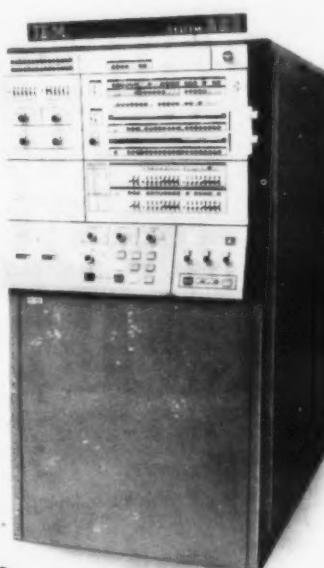
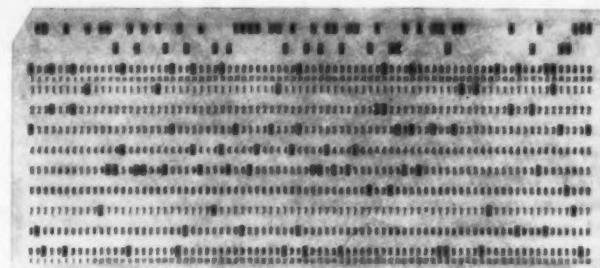
Scientific Resources Corp., Philadelphia has announced that it has acquired Publication Engineers, Los Angeles, Calif., for an undisclosed exchange of stock. Publication Engineers provides technical data software and publication services and specializes in the preparation of technical documentation and engineering services for government prime contractors, subcontractors, and government agencies.

GTS Corp. of New Orleans, La., has entered into an agreement to acquire Sigma Explorations, Limited of Calgary, Alberta, a purchaser and seller of geophysical information and an assembler of seismic data banks. GTS translates older seismic and electric well log data into a digital format compatible with modern data processing equipment and techniques. The transaction involves payment by GTS of \$100,000 (Canadian) in cash and a maximum of 85,000 shares of GTS common stock.

Management Systems Corp., Dallas, a wholly owned subsidiary of American Biomedical Corp., has announced an agreement in principle to acquire 71% of the outstanding stock of Church Records Management, Inc., Dallas, which provides a computerized membership, accounting, and records processing service for churches and synagogues. MSC presently owns a 19% interest in CRM.

URS Systems Corp., San Mateo, Calif., has reached an agreement in principle to acquire Madigan-Hyland, Inc., a New York consulting firm. URS develops computer-based management information systems and is active in urban and regional planning, engineering design, and construction supervision.

Delta Data Systems, College Park, Md., has acquired Association Processing Corp., a Pennsylvania data processing firm for cash, notes, and stock at a value of \$150,000. Delta is a computer software firm. APC provides computer consulting and data processing services to automobile clubs affiliated with the AAA.



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If your Third Generation computer has to rely on a Second Generation data entry system, you run smack into the Generation Gap every day. And it's a costly headache.

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puterized data entry. So there's no costly operator re-training to achieve greater efficiency and output-per-terminal. Here, all in one system, are the time and cost saving features KeyLogic is first to offer you:

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KeyLogic
PENTA COMPUTER ASSOCIATES INC.

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COMPUTER STOCKS: TRADING SUMMARY

Week Ending Sept. 19, 1969

COMPUTER SYSTEMS					
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE	
N	161-120	161 7/8	BURROUGHS CORP	+ 12 1/8	8.10
N	69- 38	50 3/4	COLLINS RADIO	+ 5 1/8	11.23
N	159-125	140 7/8	CONTROL DATA CORP	- 3 1/4	-2.25
A	84- 54	82 1/8	DIGITAL EQUIPMENT	+ 5 3/8	7.00
N	25- 13	15 1/4	ELECTRONIC ASSOC.	- 1/8	-0.81
N	98- 81	84	GENERAL ELECTRIC	- 1/2	-0.59
N	98- 75	97 1/8	HEWLETT-PACKARD CO	+ 5 1/4	5.71
N	141-107	140	HONEYWELL INC	+ 7 3/4	5.86
N	354-291	351	IBM	+ 7 1/2	2.18
N	149-108	147	NCR	+ 6 3/4	4.81
N	48- 35	40 3/8	RCA	+ 7/8	2.22
N	50- 30	36 1/2	RAYTHEON CO	+ 1 1/4	3.55
O	43- 24	28	SCI. CONTROL CORP.	+ 1/2	1.82
N	55- 38	44 1/2	SPERRY RAND	+ 1	2.30
A	42- 26	39 3/4	SYSTEMS FNC. LABS	+ 2 3/8	6.35

PERIPHERALS & SUBSYSTEMS					
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE	
N	82- 59	80 5/8	ADDRESSOGRAPH-MULTI	+ 5 5/8	7.50
O	71- 15	15 1/8	ALPHANUMERIC	- 1/2	-3.20
N	46- 32	46 5/8	AMPEX CORP	+ 3 7/8	9.06
O	19- 9	11 1/4	BOLT-BERANEK & NEV	+ 3/4	7.14
N	17- 9	11 1/4	BUNKER-RAMO	+ 3/8	3.45
A	37- 18	23 3/4	CALCOMP	+ 1/2	2.15
O	38- 14	16	COGNITRONICS	+ 2	14.29
A	13- 7	7 5/8	COMPUTER EQUIPMENT	- 1 1/4	-14.08
A	27- 12	15 1/8	DATA PRODUCTS CORP	+ 1 5/8	12.04
O	22- 13	15 1/4	DIGITRONICS	+ 1/4	1.67
N	72- 43	72	ELECTRON MEMORIES	+ 6	9.09
O	18- 8	8	FARRI-TEX	- 1/4	-3.03
O	37- 15	18 3/4	FARRINGTON MFG	+ 3 3/4	25.00
O	21- 10	15	INFORMATION DIS	+ 4 1/2	42.86
A	34- 17	29 3/4	MILGO ELECTRONICS	+ 5 7/8	24.61
A	89- 59	74 1/8	MORAHWA DATA SCI.	- 12 7/8	-14.80
O	118- 42	42	OPTICAL SCANNING	- 6	-12.50
O	31- 18	21	PHOTON	+ 2 3/4	15.87
A	36- 23	36 3/8	POTTER INSTRUMENT	+ 5	15.94
O	76- 54	58 1/2	RECOGNITION EQUIP	+ 2 1/2	4.46
N	61- 22	26 3/4	SANDERS ASSOCIATES	+ 1 7/8	7.54
O	85- 32	34	SCAN DATA	---	---
O	36- 16	19	TALLY CORP.	- 1/2	-2.56
N	101- 85	101	XEROX CORP	+ 5 7/8	6.18

SUPPLIES & ACCESSORIES					
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE	
O	47- 31	34 1/4	ACME VISIBLE	- 1/2	-1.44
N	22- 11	12 1/2	ADAMS-MILLIS CORP	- 1	-7.41
O	27- 23	25	BALTIMORE BUS FORM	+ 1 1/2	6.38
A	29- 17	21 1/8	BARRY WRIGHT	+ 1	4.97
O	44- 26	27 1/2	DATA DOCUMENTS	+ 1	3.77
N	42- 28	36 1/4	ENNIS BUS. FORMS	+ 4 5/8	14.62
N	104- 65	101 1/2	MEMOREX	+ 8 3/4	9.43
N	112- 94	112	3M COMPANY	+ 3 1/2	3.23
O	37- 29	34 1/8	MOORE BUS FORMS	+ 1/2	1.49
N	47- 36	45 3/8	NASHUA CORP.	+ 3/8	.83
O	48- 30	38 1/2	REYNOLDS & REYNOLD	+ 2	5.48
O	31- 23	24	STANDARD REGISTER	- 1/4	-1.03
N	35- 25	28	UARCO	+ 1 3/4	6.67
A	28- 18	13	WABASH MAGNETICS	+ 1 3/8	11.83
O	34- 28	32 1/2	WALLACE BUS FORMS	---	---

SOFTWARE & EDP SERVICES					
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE	
O	14- 5	5 1/2	ADVANCED COMP TECH	---	---
A	32- 20	20 1/2	APPLIED DATA RES	- 2 3/4	-11.83
O	19- 6	8	ARIES	+ 3/4	16.34
A	89- 63	87 3/4	AUTOMATIC DATA PRG	+ 4 1/4	5.09
O	13- 7	9	AUTO SCIENCES	+ 1 1/2	20.00
O	17- 7	8	BRANDON APPL SYS	---	---
A	21- 9	10 5/8	COMPUTER APPL	---	---
O	16- 5	9	COMPUTER ENVIRON	---	---
O	47- 15	15	COMPUTER NETWORK	- 5 1/2	-26.83
N	30- 19	23 3/8	COMPUTER SCIENCES	+ 1 7/8	8.72
O	40- 8	11 1/2	COMPUTER USAGE	+ 2	21.05
A	56- 37	55	COMPUTING & SOFT	+ 1 5/8	3.04
O	24- 5	6	DATAMATION SERVICE	- 1/4	-4.00
O	17- 6	8	DATABAB	+ 1 1/2	23.00
O	15- 5	5 1/4	DIGITEK	- 3/8	-6.67
A	38- 9	12 3/8	ELECT COMP PROC	+ 1 1/4	11.24
O	36- 17	17 1/4	INFORMATICS	- 1	-5.88
O	19- 1	1	IX CORP.	- 1 1/2	-68.00
O	22- 5	5 1/4	NAT COMP ANALYSTS	- 1/4	-4.55
N	38- 23	36 3/8	PLANNING RESEARCH	+ 1	2.83
O	11- 5	5 1/8	PROGRAMME & SYS	- 5/8	-10.87
O	18- 5	----	SOFTWARE SYSTEMS	---	---
O	37- 4	4	STRATEGIC SYS	- 1	-28.00
O	36- 11	21	TBS COMP CENT INC.	---	---
O	12- 3	3 5/8	UNITED DATA CENTER	+ 3/8	11.54
N	155- 56	67 1/8	UNIVERSITY COMP	- 3/8	-.56
O	38- 22	25	URS SYSTEMS	- 3/4	-2.91
O	16- 7	9	U.S. TIME-SHARING	---	---

LEASING COMPANIES					
EXCH	1969 RANGE	CLOSING PRICE	WEEK NET CHANGE	WEEK % CHANGE	
O	14- 8	11 1/2	BANISTER CONTIN	- 1/2	-4.17
O	45- 24	25	BOOTHE COMPUTER	+ 1/4	1.01
O	18- 4	7 1/2	COMPUTER EXCHANGE	+ 1 1/2	25.00
A	34- 18	11 1/2	COMPUTER LEASING	- 3/8	-3.16
O	12- 7	11 1/4	CYBER-TRONICS	+ 3 1/4	48.63
A	68- 23	33	DATA PROC. F & S	+ 3 1/2	11.66
O	16- 5	5 1/2	DATRONIC RENTAL	- 1	-15.38
O	52- 25	26 1/4	DEARBORN COMPUTER	- 3 1/2	-11.76
A	12- 8	9 1/2	DPA, INC.	+ 7/8	10.14
A	45- 16	20 1/2	GRANITE MGT	+ 1/4	1.23
A	28- 12	13	GREYHOUND COMPUTER	- 1/4	-1.89
N	54- 22	24	LEASCO DATA PROC.	---	---
O	9- 4	4 1/2	LECTRO COMP LEAS	---	---
A	57- 23	25 3/4	LEVIN-TOWNSEND CMP	- 7/8	-3.29
O	8- 3	4 7/8	LMC DATA INC.	+ 1 5/8	58.00
O	14- 2	2 3/4	MANAGEMENT ASSIST	- 1/2	-15.38
O	12- 6	7	NCC LEASING	+ 1	16.67
A	43- 18	39	RANDOLPH COMPUTER	+ 4 1/8	11.63
O	34- 6	6 1/2	SYSTEM CAPITAL	- 1/2	-7.14
A	28- 13	14 5/8	U.S. LEASING	+ 1/8	.86

Rally Continues

Is Basic Risk Any Less After a Drop?

By A.B. Williams

CW Staff Writer

The week ended September 19 saw all sectors rise, led by a buoyant mainframe group. These normally are the leaders, as well they might be.

It's in this group that the big sales are generated, and that the anti-IBM competitive patterns are most closely drawn.

Software Revisited

It seems strange, looking at the trading index, to see the swift decline from favor shown by the software group.

There may be a new, all-purpose market indicator here — call it the "Ignorance Index" for want of a better term.

How many of the buyers who pushed the group to the top (it used to stand higher above its March 1, 1968, base than any other) had the least idea of what software is?

When things start to go sour, who wants to be stuck with something he can't even describe?

On perhaps one hand, you can count the software companies that have had real earnings records — a large number of software firms are still one-product shops that don't really generate the cash to put back into marketing or development.

Software, as an industry, may have taken a new lease on life with unbundling. The first question that must arise now, more than ever, is, "Does company X compete with IBM in the public-domain area of already-issued systems

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Individuals to assist in design and implementation of a wide range of applications. Candidates should possess 2-5 years programming experience with a strong emphasis in COBOL and RPG. Work will be on a 360/40 DOS environment. Salary commensurate with experience and qualifications.

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Call-A-Computer Directors Elect New President

MINNEAPOLIS — Warren F. Prince has been elected president of Call-A-Computer, Inc. by the company's board of directors. He succeeds Clinton DeGabrielle, who remains a member of the board.

The announcement of Prince's election was made by James G. Rude, who continues as chairman and chief executive officer of the nationwide computer time-sharing company.

Prince, formerly vice-president, sales and marketing, is a native of California. A graduate of George Pepperdine College, Los Angeles, he received a post-graduate degree from the American Institute of Foreign Trade.

Prince joined Call-A-Computer in January, 1968, after serving as vice-president of Harris Trust and Savings Bank, Chicago, since 1966.

He has also served as a regional manager of General Electric's computer department and a district manager of Alvac Corp.

DeGabrielle, in addition to serving on Call-A-Computer's board, is president and a board member of Independent Data Processing; president of Computer International, Inc.; and a board member of Management Services Corp., CompuNet of Australia, and Time Share Europe.

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GE Names Burlingame to Top EDP Spot

NEW YORK — General Electric has named a computer and aerospace industry executive to head its U.S. computer equipment business.

John F. Burlingame becomes vice-president and general manager of GE's information systems equipment division headquartered in Phoenix, succeeding John W. Haanstra, who was killed recently in an aircraft accident.

Burlingame was formerly vice-president of the defense communication systems division at RCA in Camden, N.J., and is a 23-year veteran of GE computer and aerospace disciplines.

The appointment is effective Oct. 1.

Burlingame will be responsible for the development, production, systems applications, and marketing of GE computer systems in the U.S.

He will also have responsibility for information devices including memory equipment, document handling equipment, printer-readers, and remote terminals produced and marketed by GE in the U.S.

The division has manufacturing facilities in the Phoenix area, two plants in Oklahoma City, Okla., and one in Philadelphia, Pa., and a nationwide network of sales and service offices.

Until 1968, Burlingame had been general manager of GE's large computer systems depart-

ment, responsible for the GE-600 series and the Gecos III computer operation system.

Earlier he headed GE's special information products department where he was responsible for development of special-purpose computer systems in the military and space fields.

This organization, headquartered in Syracuse, N.Y., played a significant role in the early development of the GE-600 series computers and subsequent development of several special-purpose members of the GE-600 line.

It was also responsible for surface and aerospace electronic equipment for precision measurements of missile and space vehicle trajectories, radio guidance, and specialized communications.

Burlingame was also responsible for GE's large-scale time-sharing computer project, the GE-645 system, and its Multics software system jointly developed with Project Mac at MIT and Bell Telephone Laboratories, Inc.

Under his management the special-purpose M-605 military computer system, capable of real-time and batch-processing, was developed for the U.S. Army.

AUSTIN, Texas — Tracor Computing Corp. (TCC) has elected four corporate staff members to top management positions, according to TCC President Dr. A.F. Wittenborn.

The nationwide operations of the company will be directed by newly named Senior Vice-President Dr. Paul T. Wrotenberry and three new vice-presidents, who will report to Wrotenberry.

Ron A. Geil, previously director of the product group, becomes TCC vice-president and general manager of the products division.

Jim R. Porter is promoted to TCC vice-president and director of computing services operations from his position as director of operations of the computing services group.

Warren A. Wasson, former director of marketing for the

computing services group, is the newly named vice-president and director of computing services marketing.

As senior vice-president, Wrotenberry is in charge of all company operations in addition to his duties as TCC's chief financial officer. He was previously vice-president and general manager.

A 1964 honor graduate of The University of Texas at Austin, Wrotenberry holds a B.S., an M.A., and a Ph.D. in physics. He is a member of Sigma Xi and is listed in American Men of Science.

Before joining TCC, he held a management position with IBM.

Geil is a graduate of Iowa State University of Science and Technology with a B.S. in electrical engineering. He also attended George Washington University.

EDPeople

Tracor Computing Moves Four to Top Management

Position Announcements

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- * Joint Ventures

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On your mark... get set...	9
How to evaluate and select a vendor	
Selection Characteristics	11
How to evaluate engineering-service qualifications, service response, and maintenance costs	
What is the availability of test equipment and critical spare parts?	
What education facilities and services are available?	
What types of programming packages are available from the various vendors?	
What kind of application packages will the vendor provide?	
How will the vendor assist you in implementing a computer system?	
Summing Things Up	15
A conclusion of these general selection guidelines	

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Rooney Made RCA Division Vice-President

NEW YORK - Joseph W. Rooney has been appointed division vice-president, marketing operations staff, RCA Information Systems Division.

Rooney will be responsible for all staff areas within marketing operations, including industry marketing, marketing education, marketing systems, and product marketing at RCA's computer division headquarters in Cherry Hill, N.J.

He has 19 years' experience in various computer marketing positions with IBM, serving most recently as manager of information marketing services for the Service Bureau Corp., a wholly owned subsidiary of IBM.

In that position he was responsible for all time-sharing services marketing and operations functions.

Executive Corner

Hewitt Named Divisional Vice-President by IBM

WHITE PLAINS, N.Y. - James M. Hewitt has been named vice-president, marketing development, for IBM's data processing division.

Hewitt formerly was systems manager, large systems, for the company's systems development division in Poughkeepsie, N.Y.

In his new position, he is responsible for the planning and development of program products marketed by the data processing division.

Hewitt joined IBM as a sales trainee in Seattle in 1955. He became a marketing manager in

the company's Denver branch office in 1962 and subsequently held several managerial positions at divisional headquarters in Harrison, N.Y.

Hewitt is a graduate of the University of Washington, where he received a B.S. in electrical engineering.

R.F. Mock Named to V.P. Post in Univac Organization

PHILADELPHIA - Richard F. Mock has been named vice-president, field marketing, in Sperry Rand's Univac data processing division.

A member of the Univac organization since 1947, Mock was vice-president, product and business plans, immediately prior to his new appointment. Before that he was regional sales manager for the Northeast region, with offices in Wellesley, Mass.

A native of Maryland, Mock holds a B.S. degree from Benjamin Franklin University, Washington, D.C.

Other Recent Moves

- The Victor Comptometer Corp. business machines group, headquartered in Chicago, has announced the appointment of Modestas Jakaitis as EDP national technical manager.

- Control Data Corp., Minneapolis, has announced two promotions: Richard J. Thomas to general manager of the business forms operation, CDC's business products group, and Vernon E. Sieling to general manager for marketing and planning.

- Seymour M. Mendel has been appointed marketing manager for the apparel and textile industries in the Eastern operations of Honeywell's electronic data processing division.

- Louis C. Ray has been named manager of applications development by Information International of Los Angeles. He will be responsible for the design of new applications for the company's line of programmable visual analysis equipment.

- O.F. Shinn has been appointed president of Lykes/University Computing Co., which was recently formed by University Computing Co. and Lykes-Youngstown Corp. to furnish commercial data processing services in the southeastern United States. The firm's headquarters will be in Atlanta.

- North American Rockwell Corp. of El Segundo, Calif., has announced the appointment of Willard D. Olsen as consultant, financial systems, at its corporate offices.

- U.S. Systems & Software, Inc. of Los Angeles has announced the election of Wellwood E. Beall to chairman of the board of directors. Charles T. Simmons, formerly senior vice-president, has been named president of the company.

- David C. Jones has been appointed director, methods and systems, for Am-Ex Express Reservation Services, Inc., of Memphis, Tenn., a wholly owned subsidiary of American Express Co. of New York.

- Digital Equipment Corp. of Maynard, Mass., has announced the appointment of William G. Segal to manager of biomedical marketing.

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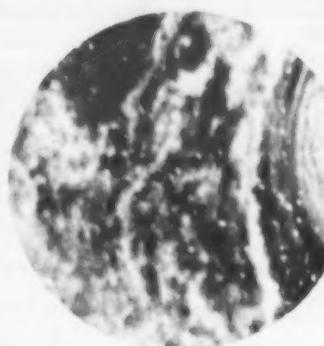
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